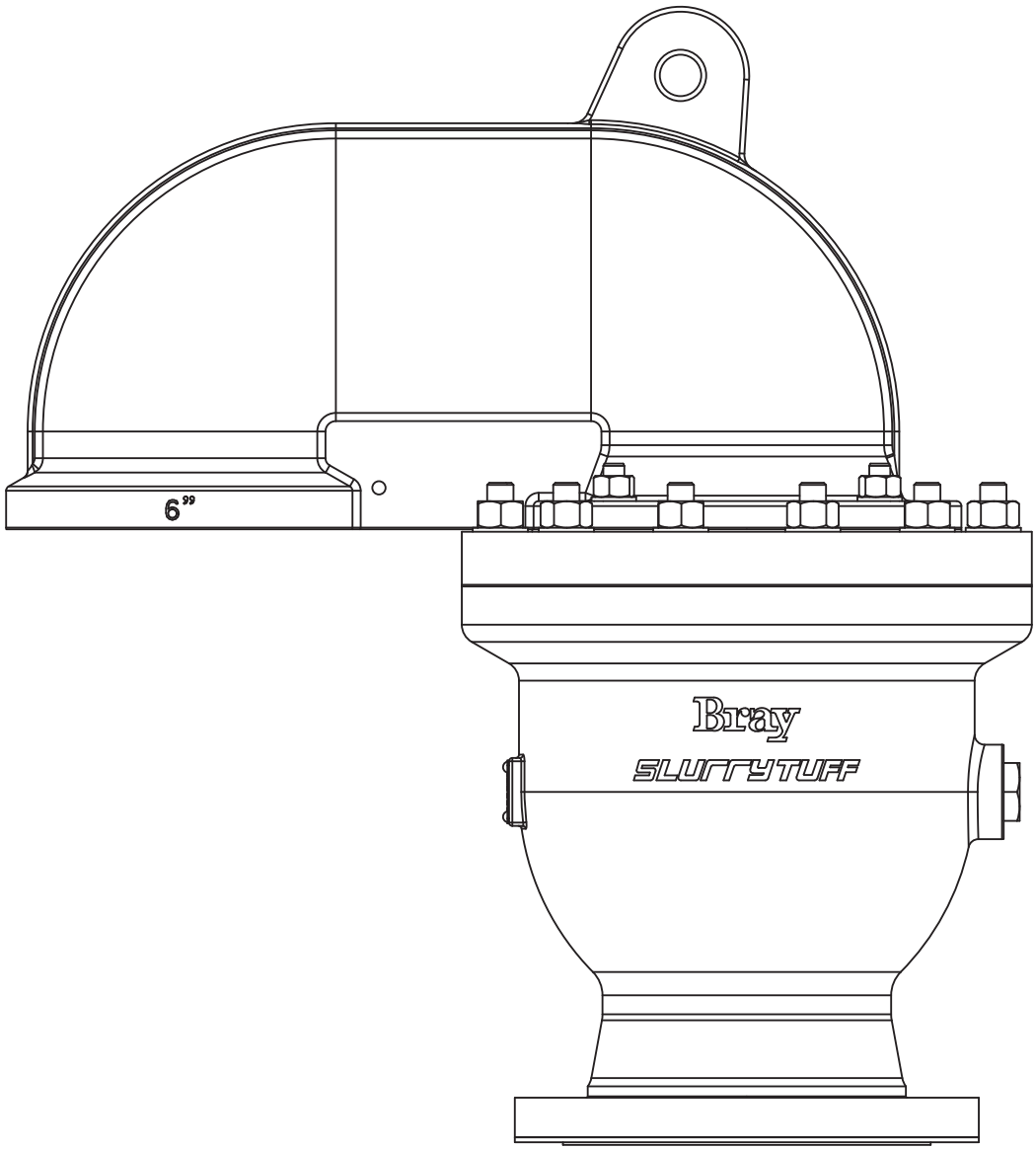
SERIES EV / EB

AIR RELEASE AND VACUUM BREAK VALVES

Installation, Operation, and Maintenance Manual



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CONTENTS

READ AND FOLLOW THESE INSTRUCTIONS CAREFULLY.
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1.0 DEFINITION OF TERMS

All information within this manual is relevant to the safe operation and proper care of your Bray valve. Please understand the following examples of information used throughout this manual.

Specific instructions for non-standard materials of construction, temperature range, etc. should be referred to the factory.

1.1 Safety Statements

To prevent unwanted consequences, standard symbols and classifications are used as shown below:

DANGER
Indicates a potentially hazardous situation which, if not avoided, will result in death or serious injury.

WARNING
Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION
Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE
Used without the safety alert symbol, indicates a potential situation which, if not avoided, may result in an undesirable result or state, including property damage.

NOTE: Provides important information related to a procedure.

2.0 GENERAL INFORMATION

2.1 Introduction

WARNING

Do not exceed the maximum pressure rating of the valve at any time during operation.

The instructions provided herewith should be thoroughly read and understood prior to any installation or maintenance activities. Bray recommends that only experienced and skilled personnel be allowed to install and maintain these products.

This manual is an overview only and does not in any way replace the vital functions of on-site, process engineer(s), pipe fitter(s), etc. Please retain this manual in an easily accessible location for all employees that may need to reference it routinely.

2.2 Models

1. The Bray EZI-VAC series EV is a double-acting valve designed to automatically discharge large volumes of air from a pipeline during filling. The series EV also allows large volumes of air to enter the piping system to prevent a vacuum during draining. During normal operation of the piping system with sufficient head pressure the valve will remain closed.

2. The Bray EZI-VAC series EB is a single-acting valve designed to automatically allow large volumes of air to enter a piping system during draining or vacuum condition. The series EB is normally closed during filling operation and normal operation of the piping system.

The Bray EZI-VAC's offers high performance in applications ranging from general purpose to severe media handling and is provided epoxy coated as standard with various options of elastomer lining or other specialized coatings.

Additional product information (such as application data, engineering specifications, etc.) is available from your local Bray distributor or sales representative, or online at BRAY.COM

For a detailed list of product certifications please contact your local Bray representative.

3.0 SAFETY INFORMATION

NOTICE

Failure to follow these procedures could affect product warranty.

WARNING

> The valve must only be installed, commissioned, operated, and repaired by qualified personnel.
> The device generates a large mechanical force during normal operation.
> All installation, commissioning, operation, and maintenance must be performed under strict observation of all applicable codes, standards, and safety regulations.
> Observe all applicable safety regulations for valves installed in potentially explosive (hazardous) locations.

3.1 Hazard-Free Use

NOTICE

Failure to follow these procedures could affect product warranty.

This device left the factory in proper condition to be safely installed and operated in a hazard-free manner. The notes and warnings in this document must be observed by the user if this safe condition is to be maintained and hazard-free operation of the device assured.

Take all necessary precautions to prevent damage to the valve due to rough handling, impact, or improper storage. Do not use abrasive compounds to clean the valve, or scrape metal surfaces with any objects.

The control systems in which the valve is installed must have proper safeguards — to prevent injury to personnel, or damage to equipment — should failure of system components occur.

The upper limits of permitted pressure and temperature (depending on the housing and liner materials) must be observed. These limits are shown on the valve identification tag.

3.2 Qualified Personnel

NOTICE

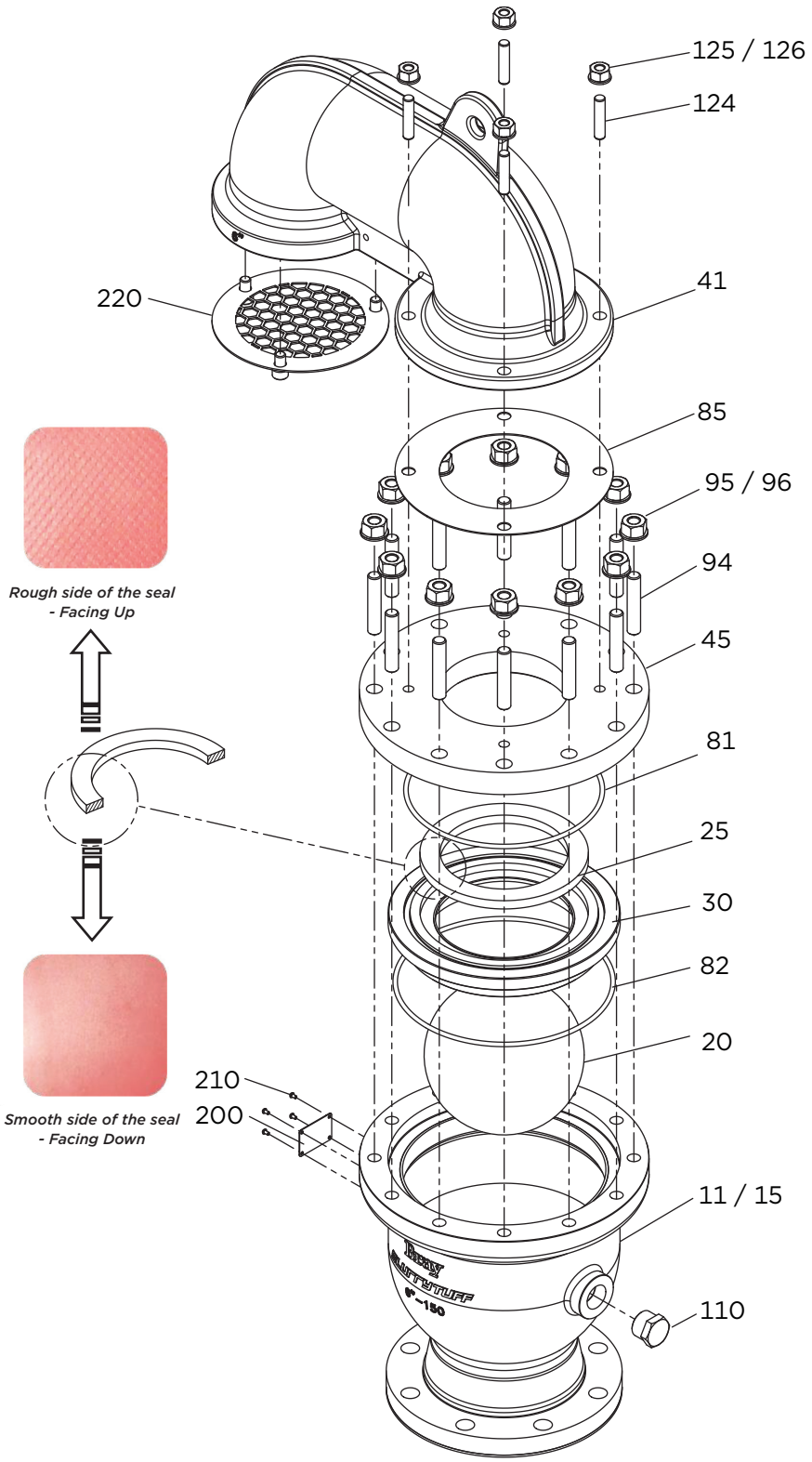
Failure to follow these procedures could affect product warranty.

A qualified person (in terms of this document) is one who is familiar with the installation, commissioning, and operation of the device, and who has appropriate qualifications, such as:

1. Is trained in the operation and maintenance of pressure equipment and systems in accordance with established safety practices.
2. Is trained in the commissioning, operation, and maintenance of equipment in hazardous locations — in cases where the device is installed in a potentially explosive (hazardous) location.

4.0 PARTS IDENTIFICATION

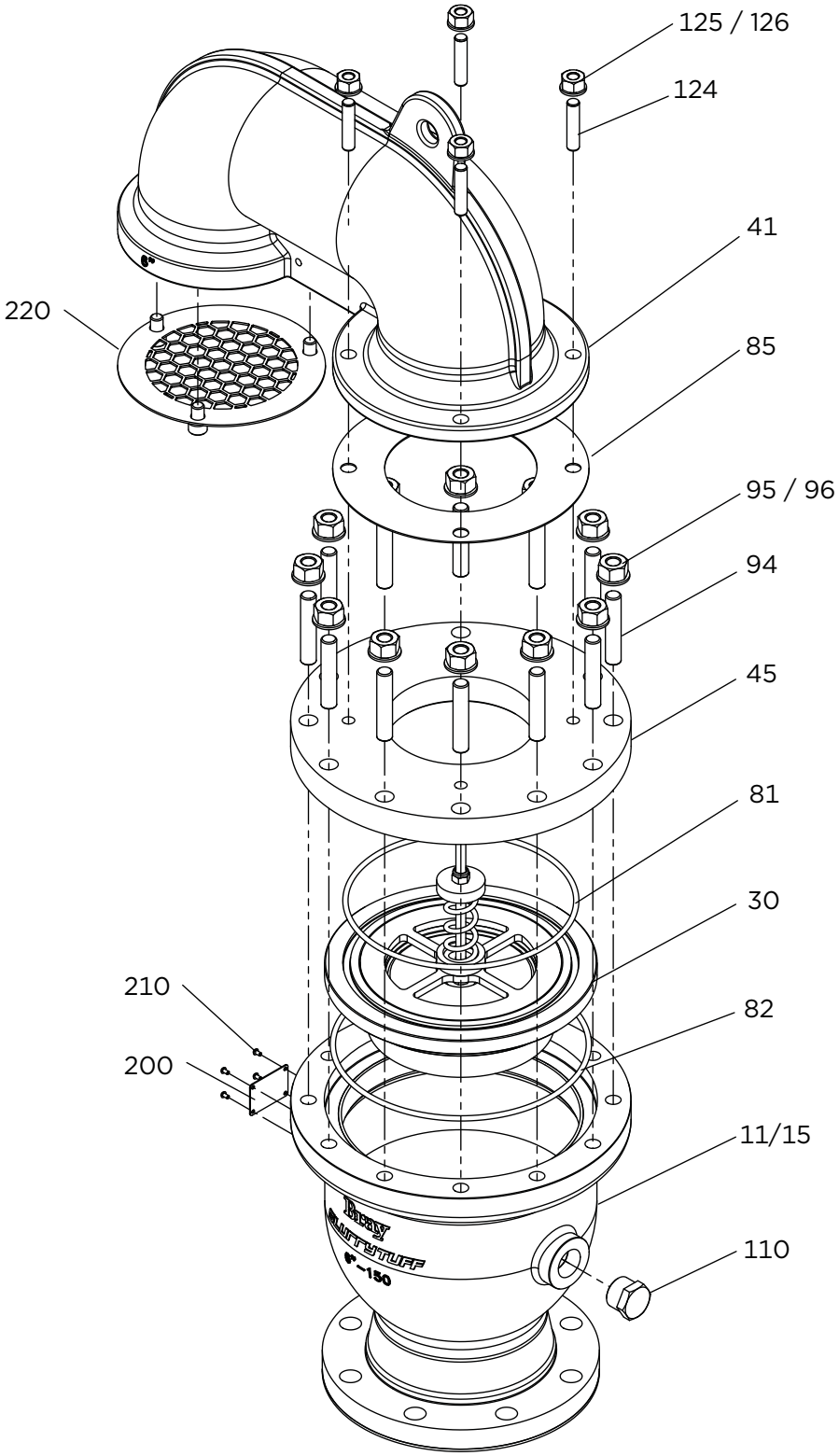
4.1 Series EV Parts Identification



Item	Description
11	Body
15	Body Lining (Optional)
20	Float
25	Seal
30	Locating Ring
41	Outlet Elbow
45	Bonnet
81	O-Ring
82	O-Ring
85	Gasket
94	Body - Stud
95	Body - Nut
96	Body - Washer
110	Flushing Plug
124	Outlet Elbow - Stud
125	Outlet Elbow - Nut
126	Outlet Elbow - Washer
200	Name Plate
210	Drive Screw
220	Birdscreen Kit (Optional)

Figure 1: EZI-VAC Air Release & Vacuum Break Valve (Series EV)

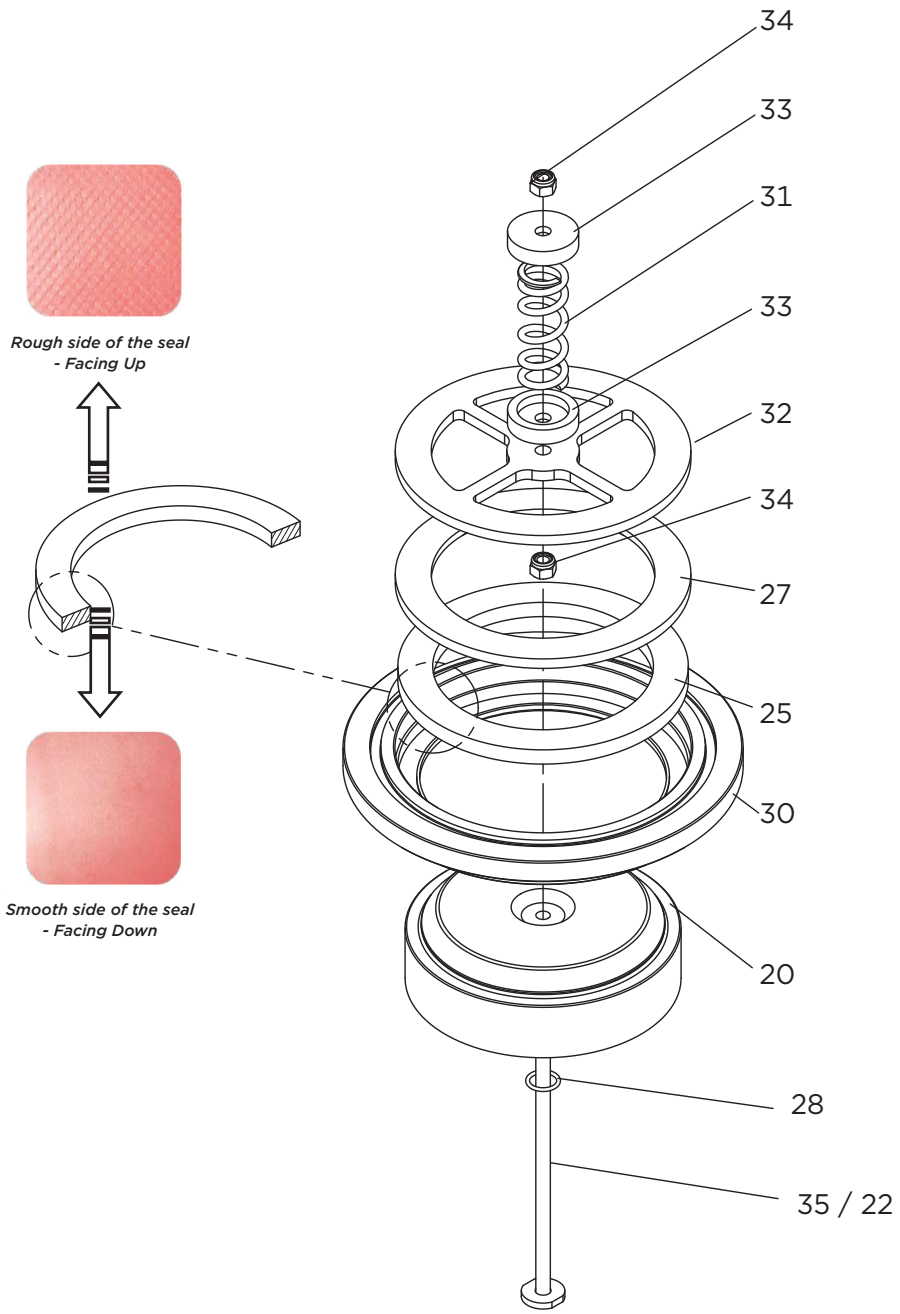
4.2 Series EB Parts Identification



Item	Description
11	Body
15	Body Lining (Optional)
30	Vacuum Break Assembly
41	Outlet Elbow
45	Bonnet
81	O-Ring
82	O-Ring
85	Gasket
94	Body - Stud
95	Body - Nut
96	Body - Washer
110	Flushing Plug
124	Outlet Elbow - Stud
125	Outlet Elbow - Nut
126	Outlet Elbow - Washer
200	Name Plate
210	Drive Screw
220	Birdscreen Kit (Optional)

Figure 2: EZI-VAC Vacuum Break Valve (Series EB)

4.3 Series EB Cage Parts Identification



Item	Description
20	Disc
22	Disc Support Ring
25	Seal
27	Seal Retainer
28	O-Ring
30	Locating Ring
31	Spring
32	Spring Support Ring
33	Spring Retainer
34	Nylock Nut
35	Tie Rod

Figure 3: EB Cage Assembly

4.4 Typical Lining Body

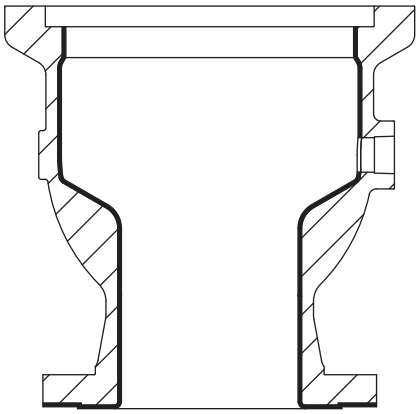


Figure 4

4.5 Spare Parts

1. Use only Bray original spare parts.
2. Recommended spare parts are identified in the Parts Identification drawing and list for each product model.
3. Bray cannot accept responsibility for any damages that occur from using spare parts or fastening materials from other manufacturers. If Bray products (especially soft good materials) have been stored for long periods of time, check them for corrosion or deterioration before putting them into use.

WARNING

Before products are returned to Bray for repair or service, Bray must be provided with a certificate that confirms that the product has been decontaminated and is clean.

5.0 VALVE IDENTIFICATION

Identification Tag

All valves are provided with an identification tag that is unique to each valve. The following table is a representation of information that may be included.

DATA	LABEL	DESCRIPTION
Serial Number	S/N	Unique serial number of valve.
Valve Size	NB	Valve size e.g. 6 in/150 mm.
Part Number	Part	Part number of the Valve
Flange Drill	FLG	Flange Drill e.g. ASME B16.5 CL150.
Maximum Permissible Pressure	CWP	Maximum permissible pressure in psi/bar(g)
Mass	Mass	Mass of the valve in kg
Temperature Limit	Max Temp	Maximum temperature in °C

6.0 HANDLING REQUIREMENTS

CAUTION

Lifting lugs are designed to lift only the valve, and any decant connection to the elbow must be supported on site.

6.1 Packed Valves

Crates: Lifting and handling of the packed valves in crates will be carried out by a forklift truck, by means of the appropriate fork hitches.

Cases: The lifting of packed valves in cases will be carried out in the lifting points and in the center of gravity position which has been marked. The transportation of all packed material must be carried out safely and following the local safety regulations.

6.2 Unpacked Valves

INSPECTION OF PACKAGING: Care should be taken to inspect the product packaging for damage on all goods received while the freight carrier is still present. Any observed packaging damage should be reported immediately to the carrier, & any claim requirements followed through.

Lifting and handling of valves should be carried out by using appropriate means and observing the carrying limits. Handling must be carried out on pallets, protecting all machined surfaces to avoid any damage.

With large bore valves, rigging the load must be carried out by using the appropriate tools to prevent the valve from falling or moving during the lifting and handling.

All valves are supplied with as-cast lifting lug which must be used to lift the valve & support the valve during alignment/installation. Improper use will result in valve body damage.

CAUTION

- For handling and/or lifting, the lifting equipment (fasteners, hooks, etc.) must be sized and selected while considering the product weight indicated in our packing list and/or delivery note.
- Lifting and handling must be performed only by qualified personnel.
- Fasteners must be protected by plastic covers in sharp corner areas.
- Caution must be taken during handling to avoid this equipment passing over workers, or over any other place where a possible fall could cause injury or damage. In all cases, local safety regulations must be respected.

Any provided valve protection accessories such as wooden plates or plastic caps should not be removed until the valves are ready to be installed, to keep foreign contaminants out.

Transportation of all packed goods should be carried out in accordance with relevant site & territory safety regulations.

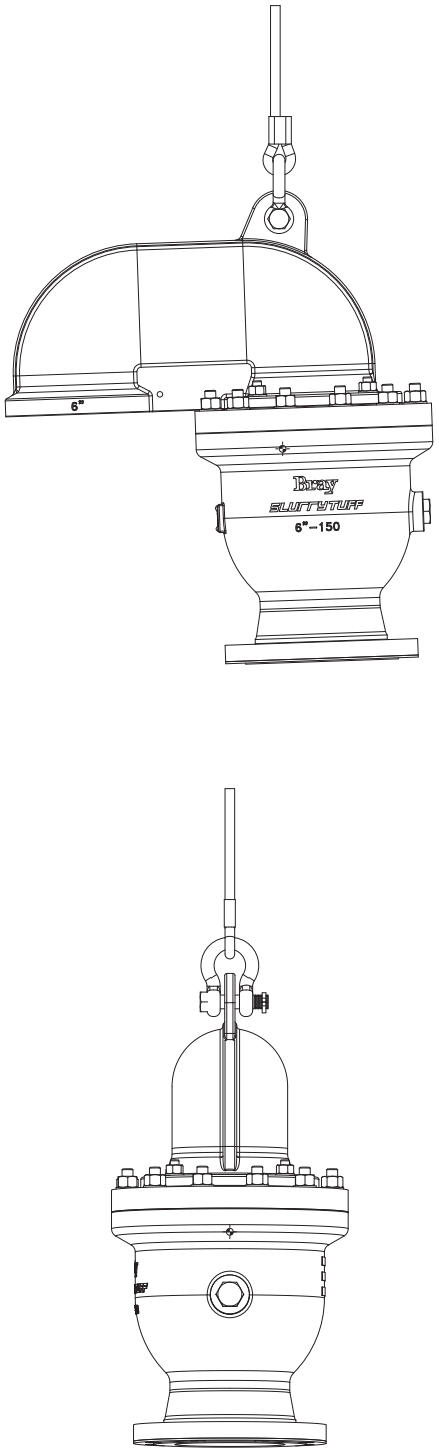


Figure 5: Typical Lifting Illustrations

7.0 TRANSPORT AND STORAGE

NOTICE

The packaging is designed to protect the products only during shipping. If the product is not installed immediately after delivery, then it must stored according to these requirements. Failure to follow these procedures could affect product warranty.

7.1 Short-Term Storage

Short-term storage is defined as storage of valves to allow for project construction and will be installed within a relatively short amount of time (three months or less). During short-term storage, the following is required:

The preferred storage location is a clean, dry, protected warehouse. Do not expose the valve to temperature extremes.

End protectors shall remain on the valve ends to prevent the entrance of dirt, debris, or insects/wildlife. Protect valve lining from heat, light, and exposure to ozone.

Valves shall remain in the original shipping container with the original packaging materials. This packaging method will not protect valves that will be stored outside, uncovered, and unprotected.

Storage of valves in an open, uncovered area is permissible but requires provisions for inclement weather. The product must be elevated from the ground on a pallet, a shelf, or other suitable surface, and must be covered with a secure, waterproof tarp.

Do not stack the valves on top of each other.

7.2 Long-Term Storage

Long-term storage is defined as storage of valves for periods longer than three months. During long-term storage, the following are required:

The storage location shall be a clean, dry, protected warehouse. Do not expose the valve to temperature extremes.

End protectors shall remain on the valve ends to prevent the entrance of dirt, debris, or insects/wildlife.

Product shall remain in the original shipping container with the original packaging materials.

Do not stack the valves on top of each other.

Valves and equipment containing elastomers, including O-rings, must be stored in a climate-controlled warehouse according to SAE-ARP5316D requiring:

> The ambient relative humidity to be less than 75%.
> No exposure from direct ultraviolet or sunlight.
> Protection from ozone generating equipment or combustible gases and vapors.
> Storage at temperatures below 100°F (38°C), away from direct sources of heat.
> No exposure to ionizing radiation.

Storage inspection — visual inspection shall be performed on a semi-annual basis and results recorded. Inspection, as a minimum, shall include reviewing the following:

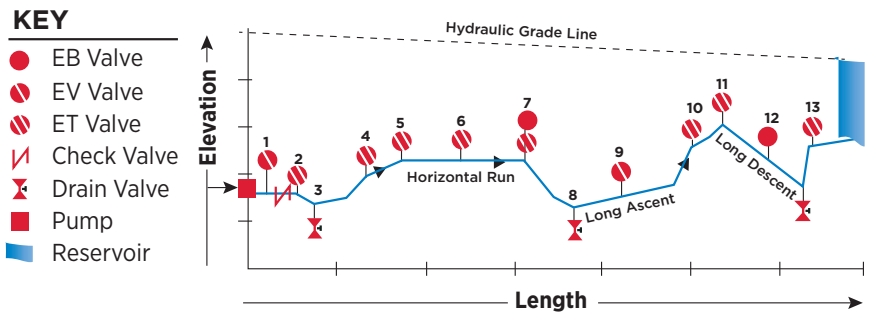
> Packaging.
> Flange covers.
> Dryness.
> Cleanliness.

Do not stack the valves on top of each other.

Leave protective caps and covers on the product.

8.0 INSTALLATION AND COMMISSIONING

MODEL APPLICATION GUIDE



Note: Refer AWWA M51 for application guide

WARNING

Verify line is depressurized before installing, removing, or repairing a valve.

NOTICE

All valves shall be installed in a vertical orientation only.

Before installing the valve, check the valve body port for any foreign material that may have been collected during shipping or storage.

When the valve is lined, the body lining incorporates a built-in flange gasket function. Do not use additional flange gaskets.

Tighten bolts in a crisscross pattern for uniform tightness of flanges as shown in **Figure 6.**

Exceeding recommended torque values will reduce the overall valve performance and may permanently damage the seat or other parts. See Table 1 on the following page for maximum flange bolt tightening torques for metallic and FRP flanges.

Ensure the mating line flanges are properly aligned prior to installation.

The point of installation is determined by piping engineering design (outside of Bray's scope) and must be adhered to. Typically, these are the high points in the piping system, but this may vary depending on the installation. The following considerations are mandatory to ensure the correct operation of the valve:

> The valve must be installed in a vertical position with the outlet directed toward the ground (unless a different configuration has been specifically requested).

> The maximum allowable angular deviation from vertical is 7.5°

> EV Only: The minimum static head pressure at valve elevation must be equivalent to 3 meters of head (0.3 barg).

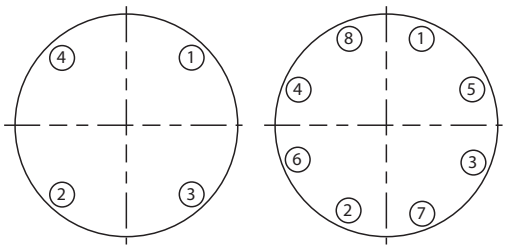
8.1 Flanging Details and Mounting Hardware

The Series EZI-VAC valves utilize standard through-bolt holes for mounting onto pipeline flanges.

The length of the bolt used must prevent bottoming while tightening. For the number of bolts necessary and bolt diameter, please refer to the applicable flange standard listed in Section 8.4.

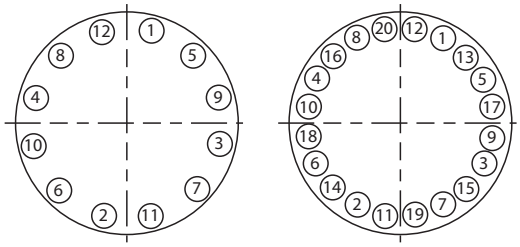
8.2 Recommended Body Nut Tightening Torque

4 Bolt and 8 Bolt Flanges



- Lubricate, hand tighten, then SNUG up bolts
- **Round1 -** Tighten to 25% of final torque
- **Round 2 -** Tighten to 50% of final torque
- **Round 3 -** tighten to 100% of final torque

12 Bolt Flanges and Above



- Lubricate, hand tighten, then SNUG up bolts
- **Round1 -** Tighten to 20% of final torque
- **Round 2 -** Tighten to 40% of final torque
- **Round 3 -** tighten to 80% of final torque
- **Round 4 -** Tighten to 100% of final torque

Figure 6

8.3 Recommended Flange Tightening Torque

Table 1

RECOMMENDED TIGHTENING TORQUE (LINED VALVE)

Valve Size		#150		#300	
NPS.	DN	ft-lb	N-m	ft-lb	N-m
1	25	10-15	15-20	25-30	35-40
2	50	25-30	35-40	25-30	35-40
3	80	30-35	40-45	50-55	70-75
4	100	25-30	35-40	55-60	75-80
6	150	50-55	70-75	60-65	75-85
8	200	55-65	75-85	80-100	110-140
10	250	70-90	100-120	110-150	150-200
12	300	75-100	105-135	185-220	250-300

For non-lined valves, refer to the gasket supplier's recommended tightening torque.

8.4 Recommended Fasteners - ASME B16.5 Class 150 & 300 Flange

Table 2

Recommended Fastener Size		Cl150				Cl300			
Valve Size				Length Of Bolts				Length Of Bolts	
NPS	DN	Bolt/Stud & Nut Size	No. Of Bolts	Stud Bolts (1.5mm Rf)	Machine Bolts	Bolt/Stud & Nut Size	No. Of Bolts	Stud Bolts (1.5mm Rf)	Machine Bolts
1	25	1/2	4	75	65	5/8	4	85	75
2	50	5/8	4	95	75	5/8	8	100	120
3	80	5/8	4	100	90	3/4	8	120	100
4	100	5/8	8	100	90	3/4	8	125	105
6	150	3/4	8	110	95	3/4	12	130	120
8	200	3/4	8	120	110	7/8	12	150	130
10	250	7/8	12	130	120	1	16	170	150
12	300	7/8	12	130	120	1 1/8	16	195	175

9.0 OPERATION

9.1 Series EV

Series EZI-VAC 'EV model' is suitable for air release/vacuum break application.

The valve allows air to exit the piping system during filling operations.

The valve closes by the rise of fluid media inside the valve which moves the float up to the locating ring & seal thus providing a bubble tight shutoff.

When the fluid level and pressure equalizes, the float will descend, allowing air to enter the piping system and break any vacuum present.

9.2 Series EB

Series 'EB model' is suitable only for vacuum break application.

This valve uses a spring-loaded disc, which is normally closed, unless a vacuum is drawn.

Once the vacuum pressure exceeds the set pressure, the disc will open allowing air into the piping system.

Once the vacuum pressure drops below the set pressure, the compressed spring will cause the valve to close.

10.0 STANDARD MAINTENANCE AND REPAIR

10.1 Series EV

WARNING

Verify line is depressurized before installing, removing, or repairing a valve.

WARNING

After completing any alterations or maintenance procedures, the product must be tested to confirm performance requirements.

NOTICE

Any modification or use of unauthorized parts voids any and all warranty considerations

NOTICE

Note assembly positions before removal.

Inspect the valve body and outlet at a regular interval. Check for any signs of corrosion, components wear and/or damage caused by process media.

Some models, as shown in **Figure 1** and **Figure 2**, are supplied with cast elbows that can be removed for inspection without removing the valve bonnet. This procedure must only be performed when the valve is fully isolated and depressurized.

Inspect for any leakage from the outlet or body joints.

Parts listed in **Table 3** below may wear out and require replacement during the normal life of the valve; they may be replaced on-site by the user with spare parts supplied by Bray.

NOTICE

Use only Bray supplied spare kits for proper working.

Failure to follow this could affect product warranty.

Cleaning or flushing of the valve may be carried out periodically using the provided flush port. Ensure the valve is properly isolated and all pressure within the valve body is fully relieved before performing any flushing operations.

Flush port sizes: **Table 4.**

Table 3

Replacement Parts		
Part #	**Description**	**Qty per Valve**
25	Seal	1
20	Float	1
30	Locating ring	1
80, 81	O-ring set	1

Table 4

EV/EB Valve Size & Class Rating	Flush Port Size
DN25 – DN100 (CL150/300)	½” NPT
DN150 – DN300 (CL150/300)	1” NPT

10.2 Disassembly Instructions

The simple design of the Bray/EZI-VAC air release/vacuum break valve permits easy assembly and disassembly. The following dis-assembly procedure applies to all Bray/EZI-VAC air release/ vacuum break valves.

To Disassemble the valve:

1. Depressurize, drain and isolate the valve in the pipeline before proceeding.
2. Disassemble the valve from pipeline and place the valve in upright position.
3. If separation of the outlet from the bonnet is required, remove the outlet by unscrewing the fasteners from the bonnet. Otherwise, unscrew the body fasteners.
   Note: Older models have single-piece bonnet and elbow.
4. For series EV, remove the locating ring along with seal from the body to remove the float.
5. For series EB, remove the cage assembly. Refer Section 4.3 EB Cage Part Identification for dis-assembly sequence.

NOTICE

Mark the spring height on the threaded tie rod and de-energize spring by loosening the Nylock nut.

CAUTION

Care must be taken when loosening the nut, as the spring may be under compression.

6. Remove the O-Rings if required.
7. Gently lift the float out of the body, using nets if necessary for larger floats. If needed, tilt the body onto its side to make removal easier. Not applicable for EB.

Note: We recommend Bray/EZI-VAC spares sourced every time the valve is being repaired.

10.3 Reassembly Instructions

Clean all parts with acceptable solvent while valve is being serviced.

Place the valve in a vertical position with the inlet flange at the bottom.

Insert both the O-Ring in the Locating ring groove.

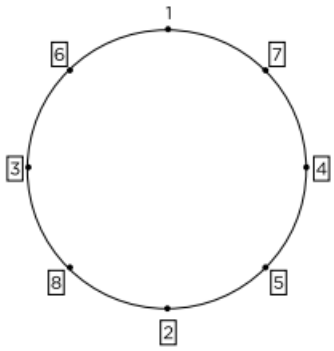
It is important to smooth out the O-Ring so that there are no visible ripples or loops.

It should be noted that the O-Ring groove is slightly larger than the O-Ring and it follows that the O-Ring must be hoop stretched to engage the groove.

NOTICE

INSERT O-RING AS FOLLOWS

1. Place O-Ring on to the respective grooves.
2. To prevent looping, insert the O-Ring as shown by pressing the O-Ring into the groove in the following numerical sequence.



Right

For series EV, gently place the float in the body cavity and then insert the locating ring in the body step.

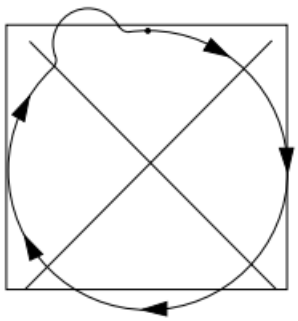
For Series EB, install the cage assembly after adjusting the spring to the initial set height. Refer section 2.3 EB Cage Part Identification for reassembly sequence.

For series EV, place the seal in the locating ring step. Ensure the rough side of the seal is facing the top side as shown in **Figure 1**.

If required by the application, apply PTFE tape or a suitable sealing compound to the flushing plugs. Install the plugs and tighten them using a hex key or wrench.

Fasten the bonnet to the body and sequentially tighten the nuts (as per **Figure 6**) onto the body according to the recommended nut torque specifications in **Table 5**.

Fasten the outlet if removed from bonnet.



Wrong

CAUTION

1. Verify that the seat seal is correctly positioned to ensure proper sealing.
2. Ensure the flushing plug is securely tightened.

10.4 Recommended Body Nut Tightening Torque

Table 5

Valve Size (in)	Class	Fastener size	Torque (N-m)	Torque (ft-lb)
1	CL150/CL300	5/8-11 UNC	49.0	36.2
2	CL150/CL300	3/4-10 UNC	93.8	69.1
3	CL150	5/8-11 UNC	49.3	36.4
	CL300	7/8-9 UNC	141.6	104.4
4	CL150	1/2-13 UNC	25.0	18.5
	CL300	3/4-10 UNC	89.8	66.2
6	CL150	5/8-11 UNC	52.2	38.5
	CL300	1-8 UNC	203.6	150.1
8	CL150	3/4-10 UNC	90.0	66.3
	CL300	1 1/8-8 UN	293.7	216.5
10	CL150	3/4-10 UNC	99.9	73.6
	CL300	1 1/4-8 UN	418.5	308.6
12	CL150	1-8 UNC	220.6	162.6
	CL300	1 1/2-8 UN	705.3	520.0

11.0 MAINTENANCE REQUIREMENTS AND INFORMATION

11.1 Valve Removal for Inspection

1. Shutting off the upstream pump acts to isolate the valve.
2. Drain the system section featuring the Air release/vacuum break valve as much as possible.
3. Vent the upstream of the valve to relieve pressure from the Air release/vacuum break valve.
4. Once pressure has been relieved successfully, move to loosen the inlet side.
5. Remove Air release/vacuum break valve from the pipeline, inspecting internals for signs of damage, & degradation.
6. If replacement parts are required, use exact valve drawing procured to identify any/all parts required for repair. Alternately please contact Bray/SlurryTuff for repair recommendations.

12.0 TROUBLESHOOTING

TROUBLE	POSSIBLE CAUSE	SOLUTION
Seat Leakage	Seal or float/disc deterioration.	A schedule for routine inspection should be implemented and performed.
	Clogging	Manual flushing.
	Damaged / Incorrectly Installed Seal; Improper Repair	Inspect the valve body and seal, replace all O-ring seals.
Body Leakage	Damaged / Incorrectly Installed Seal; Improper Repair.	Inspect the valve body and seal, replace all O-ring seals.
Slam Condition	Improper valve selection.	Valve size & selection to be reviewed based on operating conditions.
EV only: valve float does not close	Insufficient head pressure.	Verify the head pressure at the valve elevation and ensure that approximately 3 meters of head pressure is available.
EB only: valve does not open	Spring set incorrectly.	Readjust the spring to the correct setting.

NOTES:

> Bray does not accept any responsibility for the product if wear parts not tested and approved by Bray are used.

> Bray does not accept any responsibility for the product if maintenance instructions are not followed during maintenance.

NOTICE

If leakage is identified, during maintenance check the flange gasket, and flange bolt torque to ensure they are within acceptable limits. Valve removal for inspection may be required.

13.0 RETURN MERCHANDISE AUTHORIZATION

WARNING

Before products are returned to Bray for repair or service, Bray must be provided with a certificate that confirms that the product has been decontaminated and is clean.

All products that are returned require a Return Merchandise Authorization (RMA). Contact a Bray representative to obtain authorization and shipping instructions.

The following information must be provided when submitting RMA.

> Serial number

> Part number

> Month and year of manufacture

> Time of purchase (if known)

> Actuator and actuator accessories/controls specifics

> Application

> Media

> Operating temperature

> Operating pressure

> Total estimated cycles (since last installation or repair)

NOTE: Product information is provided on identification tag attached to device.

NOTICE

Materials must be cleaned and sanitized prior to return. MSDS sheets and Declaration of Decontamination are required.

SINCE 1986, BRAY HAS PROVIDED FLOW CONTROL SOLUTIONS
FOR A VARIETY OF INDUSTRIES AROUND THE WORLD.

VISIT **BRAY.COM** TO LEARN MORE ABOUT
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