GLOBAL WATER GROUP (GWG)

CHECK VALVES

Installation, Operation & Maintenance Manual

Swing, Swing Flex, Dual Disc and Single Disc Wafer Check Valves

Document No.	GWG-IOM-CV-001
Revision	Rev A
Date	October 2026
Applicable to	GWG CVFWA150, CVFWA300 & CVFSA150 Flanged Swing, CVFRS Swing Flex, CVWD & CVWDS Dual Disc and CVWS & CVWSPS Single Disc Wafer Check Valves — DN50 to DN600
Product data	GWG check valve data sheets, revision 09/2026
Prepared by	GWG — Technical Department
Contact	sales@globalwatergroup.com | +61 7 3517 5595

This document is the property of Global Water Group Pty Ltd and must not be reproduced without written consent

1. Scope and Purpose

This manual covers the safe installation, commissioning, operation, maintenance and troubleshooting of the GWG check valves supplied by Global Water Group (GWG). It is written for pipefitters, maintenance technicians and engineers. Read it before the valve is installed and keep it with the plant records. It applies to the following models:

Model	Type	Body and Trim	Sizes	Rating	Temp.	Standards
CVFWA150	Flanged swing, metal seat	WCB body; weld-deposited 13Cr seat and disc; 304 SS hinge pin	DN50–300	ANSI 150, 20 bar	0–220 °C	BS 1868; ASME B16.5, B16.10; API 598
CVFWA300	Flanged swing, metal seat	WCB body; deposited 13Cr seat and disc; A276-420 hinge pin	DN50–300	ANSI 300 RF, 50 bar at ambient	315 °C at 38 bar	API 594; ASME B16.5, B16.10; API 598
CVFSA150	Flanged swing, metal seat	CF8M (316) stainless body, disc and hinge; 316 hinge pin	DN50–300	ANSI 150, 20 bar	0–220 °C	ASME B16.34, B16.5, B16.10; API 598
CVFRS	Flanged swing flex (resilient-seat swing)	FBE ductile iron; NBR-encapsulated disc; vulcanised NBR seat	DN50–300	PN16 (1600 kPa)	0–80 °C	AS 2129 Table D / E flanges
CVWD	Wafer dual disc, spring assisted	FBE-coated iron body; SS316 discs; NBR seat	DN50–600	PN16 (1600 kPa)	max 90 °C	API 609 face-to-face; API 598
CVWDS	Wafer dual disc, spring assisted	Full SS316 body, discs, stem and spring; NBR seat	DN50–600	PN16 (1600 kPa)	max 90 °C	API 609 face-to-face; API 598
CVWS	Wafer single disc, spring assisted	Epoxy-coated iron body; SS316 disc, hinge pin, spring; NBR seat	DN50–600	PN16, EN 1092-2 drilling	not stated	DIN 3202-K3
CVWSPS	Wafer single disc, spring assisted	Full 316 stainless; NBR seat (EPDM, PTFE, Viton on request)	DN50–600	PN16; ANSI 150 / PN10 / PN16 drilling	−20 to 180 °C	DIN 3202-K3; API 598

A check valve is a passive device. It has no actuator and no operator, so how well it works depends on the pipework around it: the flow, the position in the line, the orientation and the pump or system that drives it. Sections 5 and 6 explain how to get those right. Ratings are as published on the GWG data sheets (rev 09/2026). Full specifications are in Section 3; sectional drawings and dimensions are in Appendix B.

> ⚠ **NOTE**
>
> **Reading the markings**
>
> Items marked † are general industry practice that is not stated on the GWG data sheets. They are guidance, not GWG test results. Where a duty is critical, confirm the point with GWG. Numbers in square brackets, for example [2], refer to the sources listed in Appendix C.

2. Safety Instructions

Read this manual in full before commencing any work. Failure to follow these instructions may result in personal injury, equipment damage, or an uncontrolled release of fluid.

2.1 Safe working

> ⚠ **WARNING**
>
> Never perform any work while the valve is under pressure.
>
> Isolate both sides, release the pressure, drain and flush the line, allow it to cool, and apply your site lock-out procedure. Assume the line contains hazardous fluid until proved otherwise.
>
> Never lift a valve by its hinge, stem, spring, bonnet studs or disc.
>
> All work must be performed by qualified personnel.

- Wear the personal protective equipment required by the fluid and by site rules.
- Use lifting equipment rated for the valve weight. Weights are in Appendix B and range up to 302 kg (CVFWA300-300). Sling around the body; never lift by the hinge, bonnet bolts, hook or lifting eye on a valve that is full of fluid.
- A check valve is **not** an isolation valve. It is not guaranteed to be leak-tight and must not be relied on to protect people working downstream. Fit a proper isolation valve and use your isolation procedure.

> ⚠ **CAUTION**
>
> Never weld, grind or apply heat to a valve, or to pipe next to it, while the valve is fitted. Heat damages seats, springs and coatings.
>
> Do not exceed the rated working pressure or temperature of the valve.

2.2 Pressure and temperature limits

Never operate a valve above its published pressure or temperature. Elastomer seats set their own temperature limit, which is lower than the metal body can take (for example 80 °C for CVFRS and 90 °C for CVWD and CVWDS).

> ⚠ **NOTE**
>
> **Pressure falls as temperature rises**
>
> For flanged steel valves built to ANSI classes, the allowable pressure reduces as temperature rises. The data sheets publish a single pressure for CVFWA150 and CVFSA150 across their temperature range. For service above ambient, confirm the allowable pressure at your operating temperature against ASME B16.34 or with GWG before use.

2.3 Surge and water hammer

> ⚠ **CAUTION**
>
> **Pump stops can slam a check valve**
>
> When a pump trips or stops, the flow reverses and the disc is driven onto its seat. In long or high-head pumped lines this can cause severe pressure surges that damage the valve, pipework and pump. Swing check valves close more slowly than spring-assisted types and can slam when reverse velocity builds up.
>
> The system designer must assess surge for every pumped main. Where the risk is significant, consider a spring-assisted valve, a slower pump run-down, a surge vessel, or a controlled-closure valve.

2.4 When a check valve fails

A failed or jammed-open check valve lets the fluid flow backwards. In a pumped line that can spin the pump and driver in reverse and damage both. Where reverse flow could injure someone or damage costly equipment, the system designer should not rely on one check valve alone. Provide additional protection such as an isolation valve, a second check valve, surge control or monitoring (for example a noise, vibration or pressure alarm).

> ⚠ **WARNING**
> If a check valve is noisy, slams, or you suspect it has stuck open, stop the pump if it is safe to do so, isolate the line and inspect the valve (Section 8) before restarting.

3. Valve Description and Product Range

3.1 How the valves work

All GWG check valves open when the flow is in the correct direction and close when the flow stops or reverses. They differ in how the disc moves and what closes it.

3.1.1 Swing check valves: CVFWA150, CVFWA300, CVFSA150

A single disc hangs from a hinge and pin at the top of the body. Forward flow lifts the disc clear of the seat and into a recess in the body, giving a full-bore waterway with low head loss. When the flow stops or reverses, the disc swings back onto the metal seat under its own weight and the reverse flow. The seat is inclined slightly from vertical so the disc falls shut by gravity.

- Closing depends on gravity and reverse flow only. There is no spring, lever or weight on these valves.
- The disc must be held open by the flow. Below a minimum velocity (Section 5.3) the disc is not pinned against its stop. It hunts back and forth in the stream and wears the hinge pin and disc connection.
- The valve must be installed with the hinge at the top in horizontal pipe. See Section 6.1 for orientation.

3.1.2 Swing flex check valve: CVFRS

The swing flex valve is a resilient-seat swing check. Its disc is a ductile iron core fully encapsulated in NBR rubber. It is the only moving part. The disc sits on an angled, vulcanised NBR seat and is held by the cover, with a stainless core rod in the hinge area. There is no hinge pin, lever, counterweight or spring to wear or jam.

Forward flow lifts the disc and the rubber flexes at the hinge, which gives an open, streamlined waterway and low head loss. When the flow stops or reverses, the disc swings back onto the soft seat. The rubber conforms to the seat and to small solids, so the valve closes tightly on dirty water, slurries and wastewater where a metal seat would leak. The streamlined body and top cover also let the disc be inspected or replaced without a hinge-pin or shaft seal.

- The rubber disc and seat set the limits: PN16, 0 to 80 °C, and the fluid must be compatible with NBR (Section 5.1).
- The cover must be on top and the arrow on the body must point with the flow (Section 6.1).
- Keep the flow above the minimum velocity in Section 5.3. A flex disc that is not held open flutters and fatigues at the hinge.
- Abrasive slurry will still wear the rubber. Inspect more often on those duties (Section 8.4).

3.1.3 Dual disc wafer valves: CVWD, CVWDS

Two half-discs pivot on a central stem and are closed by a spring. Forward flow pushes the discs open against the spring. As the flow falls, the spring starts closing the discs before reverse flow develops, which reduces slam. The wafer body is short and light and fits between pipe flanges (ANSI 150, AS 4087 PN16, AS 2129 Table D and E).

3.1.4 Single disc wafer valves: CVWS, CVWSPS

A single spring-assisted disc swings on a top-mounted hinge pin. The short body fits between flanges and closes quickly and quietly. CVWS has an epoxy-coated iron body with an SS316 disc. CVWSPS is full 316 stainless steel with an NBR O-ring seat and is rated from −20 to 180 °C.

> ⚠ **CAUTION**
>
> **CVWSPS: horizontal plane only**
>
> The CVWSPS data sheet states that the valve must be mounted in a horizontal plane. Do not install it in a vertical pipe.

3.2 Comparing the types

Type	Strengths	Points to watch	Typical use
Swing, metal seat (CVFWA150, CVFWA300, CVFSA150)	Full bore, low head loss, high temperature and pressure (CVFWA300), steel and stainless bodies	Needs minimum flow to hold the disc open; slower closing; needs straight pipe upstream; no spring or counterweight	Fuels, diesel, oils, steam and general industrial liquid (per data sheets)
Swing flex (CVFRS)	One moving part, soft rubber seat, no hinge pin, spring or counterweight, passes some solids, low head loss	PN16 and 80 °C limit; rubber compatibility; rubber wears in abrasive slurry	Dewatering, raw water, wastewater, slurry
Dual disc wafer (CVWD, CVWDS)	Compact and light, spring-assisted closing, reduced slam	Discs extend past the body when open — check clearance; spring and stem wear	Pump discharge protection and water duties
Single disc wafer (CVWS, CVWSPS)	Compact, spring-assisted, quiet closing	Single hinge pin carries the load; CVWSPS horizontal only	Pump discharge protection, water treatment, gas lines (CVWSPS)

3.3 GWG CVFWA150 — Flanged WCB Swing Check Valve, ANSI 150

Type	Swing check, full bore, metal seat; recess in body for the disc when fully open
Sizes	DN50 – DN300 (9 sizes)
Rating	ANSI 150 flanged; 0 to 20 bar; media 0 to 220 °C (published rating — see 2.2)
Materials	Cast carbon steel (WCB) body and bonnet, silver primer coating; weld-deposited 13Cr seat and disc; 304 SS hinge pin
Standards	Designed to BS 1868; flanges to ASME/ANSI B16.5; face-to-face to ASME B16.10; tested to API 598
Listed applications	Liquid fuels, diesel, oils, general industrial liquid service
Orientation	Horizontal, bonnet up. Vertical upward flow only after consultation with GWG †. Not for vertical downward flow.

3.3.1 CVFWA150 Components

No.	Item	Material
1	Body	WCB welding 13Cr
2	Disc	WCB welding 13Cr
3	Hinge	WCB
4	Nut	304 SS
5	Hinge pin	304 SS
6	Nut	304 SS
7	Stud	304 SS
8	Gasket	304 SS + graphite
9	Bonnet	WCB

3.4 GWG CVFWA300 — Flanged WCB Swing Check Valve, ANSI 300

Type	Swing check, full bore, metal seat; recessed disc pocket for low head loss
Sizes	DN50 – DN300 (50, 65, 80, 100, 150, 200, 250, 300)
Rating	ANSI 300 raised-face flanges; 0 to 50 bar at ambient; 315 °C at 38 bar
Materials	ASTM A216-WCB body, disc, hinge, support and bonnet; A105 seat with deposited 13Cr; deposited 13Cr on disc; A276-420 hinge pin; B7/2H bonnet bolting
Standards	Designed to API 594; RF flanges to ASME B16.5; face-to-face ASME B16.10; tested to API 598
Listed applications	Liquid fuels and diesel, oils, steam and high-temperature service, general industrial liquid service
Orientation	Horizontal, bonnet up. Vertical upward flow only after consultation with GWG †. Not for vertical downward flow.

3.4.1 CVFWA300 Components

No.	Item	Material
1	Body	ASTM A216-WCB
2	Seat	ASTM A105, deposited 13Cr
3	Disc	ASTM A216-WCB, deposited 13Cr
4	Hinge	ASTM A216-WCB
5	Hinge pin	ASTM A276-420
6	Support	ASTM A216-WCB
7	Gasket	Flexible graphite / 304
8	Bonnet	ASTM A216-WCB
9	Bonnet bolt	ASTM A193 Gr.B7
10	Bonnet bolt nut	ASTM A194 Gr.2H

3.5 GWG CVFSA150 — Flanged Stainless Steel Swing Check Valve, ANSI 150

Type	Swing check, full bore, integral metal seat; recess in body for the disc when fully open
Sizes	DN50 – DN300
Rating	ANSI 150 flanged; 0 to 20 bar; media 0 to 220 °C (published rating — see 2.2)
Materials	316 stainless steel body, disc, hinge and bonnet (ASTM A351-CF8M); A276-316 hinge pin; A193 Gr.B8 bonnet bolting
Standards	Designed to ASME B16.34; flanges to ASME/ANSI B16.5; face-to-face ASME B16.10; tested to API 598
Listed applications	Liquid fuels, diesel, oils
Orientation	Horizontal, bonnet up. Vertical upward flow only after consultation with GWG †. Not for vertical downward flow.

3.5.1 CVFSA150 Components

No.	Item	Material
1	Body	ASTM A351-CF8M
2	Seat	Integral material
3	Disc	ASTM A351-CF8M
4	Hinge	ASTM A351-CF8M
5	Hinge pin	ASTM A276-316
6	Support	ASTM A351-CF8M
7	Gasket	316 / graphite
8	Bonnet	ASTM A351-CF8M
9	Bonnet bolt	ASTM A193 Gr.B8
10	Bonnet bolt nut	ASTM A194 Gr.8

3.6 GWG CVFRS — Flanged Swing Flex Check Valve, PN16

Type	Flanged swing check; single one-piece moving disc, no external counterweight; streamlined body for low head loss
Sizes	DN50 – DN300
Rating	PN16 (1600 kPa); media 0 to 80 °C; water
Materials	Fusion-bonded epoxy (FBE) coated ductile iron body and cover; NBR-encapsulated ductile iron disc; vulcanised NBR seat; 2Cr13 stainless core rod; SS304 bolts
Flanges	AS 2129 Table D and Table E
Listed applications	Mine site dewatering, raw water, wastewater treatment, salt water, irrigation, abrasive slurries, corrosive chemicals, fire protection, mining and industrial
Orientation	Horizontal, cover up †. Vertical upward flow only after consultation with GWG †. Not for vertical downward flow.

3.6.1 CVFRS Components

No.	Item	Material
1	Body	FBE coated ductile iron
2	Core rod	2Cr13 stainless steel
3	Cover	FBE coated ductile iron
4	Cover gasket	NBR
5	Bolts	SS304
6	Drain plug	BSPT SS304
7	Disc	NBR coated ductile iron

3.7 GWG CVWD — Dual Disc Wafer Check Valve, PN16

Type	Wafer dual disc, spring-assisted closing
Sizes	DN50 – DN600
Rating	PN16 (1600 kPa); maximum 90 °C; water
Materials	FBE-coated iron body; twin SS316 discs and stem; SS304 spring; NBR seat; PTFE washers; EPDM O-ring
Flange compatibility	ANSI 150, AS 4087 PN16, AS 2129 Table D and Table E
Standards	Face-to-face to API 609; tested to API 598
Listed applications	Mine site dewatering, raw water, wastewater treatment, salt water, irrigation, abrasive slurries, corrosive chemicals, fire protection, mining and industrial
Orientation	Horizontal, stem vertical preferred †. Vertical upward flow permitted †. Vertical downward flow only after consultation with GWG †.

3.7.1 CVWD Components

No.	Item	Material
1	Body	FBE coated cast iron
2	Disc	SS316
3	Stem	SS316
4	Spring	SS304
5	Washer	PTFE
6	Washer	PTFE
7	O-ring	EPDM
8	Hex nut	SS304
9	Seat	NBR

3.8 GWG CVWDS — Stainless Steel Dual Disc Wafer Check Valve, PN16

Type	Wafer dual disc, spring-assisted closing; full 316 stainless steel
Sizes	DN50 – DN600
Rating	PN16 (1600 kPa); maximum 90 °C; water
Materials	SS316 body, discs, stem, spring and nuts; NBR seat; PTFE washers; NBR O-ring
Flange compatibility	ANSI 150, AS 4087 PN16, AS 2129 Table D and Table E
Standards	Face-to-face to API 609; tested to API 598
Listed applications	Mine site dewatering, raw water, wastewater treatment, salt water and desalination, irrigation, abrasive slurries, corrosive chemicals, fire protection, mining and industrial
Orientation	Horizontal, stem vertical preferred †. Vertical upward flow permitted †. Vertical downward flow only after consultation with GWG †.

3.8.1 CVWDS Components

No.	Item	Material
1	Body	SS316
2	Disc	SS316
3	Stem	SS316
4	Spring	SS316
5	Washer	PTFE
6	Washer	PTFE
7	O-ring	NBR
8	Hex nut	SS316
9	Seat	NBR

3.9 GWG CVWS — Single Disc Wafer Check Valve, PN16

Type	Wafer single disc swing pattern on a top-mounted hinge pin; spring-assisted closing; lifting eye for handling
Sizes	DN50 – DN600 (size range, dimensions, weights and seat material are confirmed on order)
Rating	PN16 (16 bar); EN 1092-2 PN16 flange drilling; water
Materials	Epoxy-coated cast iron body (parts list: cast iron / ductile iron); SS316 disc, hinge pin and spring; stainless steel hinge arm; NBR seat
Standards	Face-to-face to DIN 3202-K3
Listed applications	Mine site dewatering, raw water, wastewater treatment, irrigation, pump discharge protection, fire protection, mining and industrial
Orientation	Horizontal pipe with the hinge and lifting eye at the top †. Other orientations only after consultation with GWG †.

3.9.1 CVWS Components

No.	Item	Material
1	Body	Cast iron / ductile iron
2	Disc	SS316
3	Hinge arm	Stainless steel
4	Seat	NBR
5	Hinge pin	SS316
6	Spring	SS316

3.10 GWG CVWSPS — Stainless Steel Wafer Swing Check Valve, PN16

Type	Wafer single disc, spring-assisted; hook for handling
Sizes	DN50 – DN600
Rating	PN16 (16 bar); media –20 to 180 °C; drilling for ANSI 150 and DIN PN10 / PN16
Materials	316 stainless steel body, disc, spring, screws and hook; NBR O-ring seat (EPDM, PTFE and Viton on request)
Standards	Face-to-face to DIN 3202-K3 (see the data sheet); pressure tested to API 598 — shell 2.4 MPa, seal 1.76 MPa
Listed applications	Water treatment, gas industry, backflow prevention on liquid and gas lines, corrosive and hygienic duties, pump discharge protection, fire protection, mining and industrial
Orientation	Horizontal plane only (data sheet). Hook and hinge at the top.

3.10.1 CVWSPS Components

No.	Item	Material
1	Hook	316 stainless steel
2	Body	316 stainless steel
3	Screw	316 stainless steel
4	Spring	316 stainless steel
5	Disc	316 stainless steel
6	O-ring seat	NBR

4. Storage and Handling

4.1 On receipt

- Check the valve against the order: model code, size, rating, material and quantity. Compare the body markings and flow arrow with the data sheet.
- Look for transport damage: bent hinge or stem, dented or cracked body, damaged flange faces, torn or crushed rubber seats and damaged coatings (FBE or epoxy).

- Report damage or shortages to GWG and the carrier before the goods are signed for, or within the time allowed in your terms.

4.2 Handling

- Lift with slings round the body. Never lift or carry the valve by the hinge, stem, spring, bonnet studs or by the disc. On wafer valves, use the lifting eye or hook only to handle the valve itself.
- Do not drop the valve or let it strike flange faces. Do not use chains directly on coated surfaces.
- Keep the disc closed and the end protectors fitted until the valve is installed.
- Handle stainless steel valves (CVFSA150, CVWDS, CVWSPS) with clean tools and slings so that carbon steel is not transferred to the surface.

4.3 Storage

- Store indoors, dry and clean, off the ground and out of direct sunlight, in the original packaging where possible.
- Keep rubber seats and discs away from heat, ozone sources (such as electric motors) and sunlight.
- Do not stack valves on one another. Protect flange faces and wafer seat faces.
- For storage longer than about six months, coat the exposed rubber of swing flex valves (CVFRS) with a thin film of grease compatible with NBR, and keep the disc seated closed †.
- Before installation, flush out any dirt that has entered the valve.

5. Pre-Installation Checks

Most check valve problems come from the application, not the valve. Check the points below before specifying or installing a valve.

5.1 Match the valve to the duty

Model	Applications listed on the data sheet	Notes
CVFWA150 / CVFSA150	Liquid fuels, diesel, oils, general industrial liquid service	Metal-seated; suited to clean liquids. Consult GWG before using on dirty water, dewatering or pump discharge duty.
CVFWA300	Liquid fuels and diesel, oils, steam and high-temperature service, general industrial liquid service	Highest pressure and temperature rating in the range.
CVFRS	Mine site dewatering, raw water, wastewater, salt water, irrigation, abrasive slurries, corrosive chemicals, fire protection, mining and industrial	Rubber seat and disc: check compatibility with the fluid and keep within 80 °C.
CVWD / CVWDS	As CVFRS; CVWDS adds salt water and desalination	Use CVWDS where a coating cannot be tolerated or the fluid is corrosive.
CVWS / CVWSPS	CVWS: dewatering, raw water, wastewater, irrigation, pump discharge protection, fire protection, mining. CVWSPS: water treatment, gas industry, backflow prevention on liquid and gas lines, corrosive and hygienic duties, pump discharge protection, fire protection, mining	CVWSPS suits −20 to 180 °C; horizontal pipe only.

Check that the fluid is compatible with every wetted material in the parts list (Section 3). NBR is not suitable for every fluid; alternative seat materials for CVWSPS (EPDM, PTFE, Viton) are available on request. Abrasive solids wear seats, hinges and springs quickly, so inspect more often (Section 8.1).

5.2 Do not simply match the line size

A check valve should be sized for the flow it will actually see, not automatically for the pipe size. An oversized valve passes the flow at low velocity, cannot hold its disc fully open and wears quickly. If the valve must be smaller than the line, fit reducers and allow the straight pipe lengths in Section 5.4 on each side.

5.3 Minimum flow to keep the disc open

A disc that is not held fully open by the flow is in constant motion. The usual result is noise, vibration and premature wear of the hinge, pin and disc. As a guide for water:

- **Swing check valves** (CVFWA150, CVFWA300, CVFSA150, CVFRS): keep the flow velocity through the valve at or above about 2.3 m/s (7.5 ft/s) † [2].
- **Spring-assisted wafer valves** (CVWD, CVWDS, CVWS, CVWSPS): the spring helps the disc close, and these valves are generally fully open at lower velocities, about 1.2 m/s (4 ft/s) † [2].

The table gives the flow needed to reach these velocities through the nominal bore. Check your duty point (pump curve and system curve) against it, including the lowest flow the pump will run at.

DN	Swing types: flow at 2.3 m/s (L/s)	Spring-assisted: flow at 1.2 m/s (L/s)	Swing types (m^3/h)
50	4.5	2.4	16
65	7.6	4.0	27
80	11.6	6.0	42
100	18.1	9.4	65
125	28.2	14.7	102
150	40.6	21.2	146
200	72.3	37.7	260
250	112.9	58.9	406
300	162.6	84.8	585
350	221.3	115.5	797
400	289.0	150.8	1,040
450	365.8	190.9	1,317
500	451.6	235.6	1,626
600	650.3	339.3	2,341

Flow $Q = v \times \pi/4 \times DN^2$, with DN in metres and v in m/s, gives Q in m^3/s. Nominal bore is used; the true bore differs slightly. CVFWA150, CVFWA300 and CVFSA150 are available to DN300 and CVFRS to DN300; the larger sizes apply to the wafer valves.

> ⚠ **NOTE**
>
> **GWG recommendation: if the flow is below the minimum**
>
> Choose a smaller valve with reducers, change to a spring-assisted type, or speak to GWG. Do not accept a valve that rattles at the normal duty point; the hinge pin will wear out.

5.4 Position in the pipework

Turbulence is the second main cause of early failure. A pump outlet, increaser, elbow, tee or control valve upstream of a check valve throws a skewed, unsteady flow onto the disc. The disc is pushed around its hinge, and the pin and disc connection wear. The remedy is straight pipe.

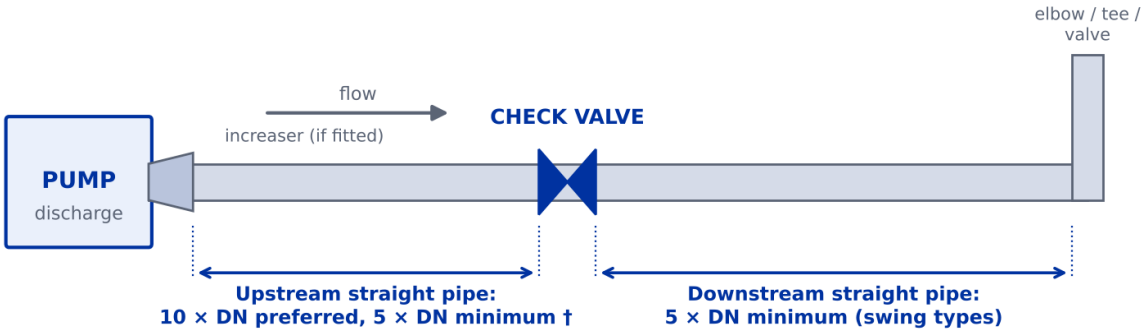


Figure 1 Recommended straight pipe around a check valve (DN = nominal diameter)

Location	Swing types	Spring-assisted wafer types
Upstream: from pump outlet, increaser, elbow, tee or valve	10 × DN preferred; 5 × DN minimum if space is limited and GWG agrees † [2] [3][4]	5 × DN † [2]
Downstream: to the next elbow or fitting	5 × DN † [4]	2 × DN †

Numbers in square brackets refer to the sources in Appendix C. They are manufacturer and industry guidance, not GWG test results.

> ⚠ **CAUTION**
>
> **Do not fit a swing check directly on a pump discharge**
>
> A swing check valve bolted to the pump outlet or to an increaser immediately after it sees the worst flow in the system: a high-velocity, swirling jet that strikes the disc and pin connection. This is a common cause of rapid hinge pin and disc failure. Allow the straight length in the table, or select a spring-assisted wafer valve designed for pump discharge duty and confirm its spacing with GWG. See [2] and [4].

Other layout rules:

- Keep an increaser between the pump and the valve to no more than two pipe sizes †.
- Do not fit a check valve directly against a butterfly valve, a reducer, or a stub flange with a restricted bore. The disc, or on dual disc valves the discs, must be free to open fully (Section 6.4).
- Avoid positions where the flow is pulsating, such as directly after a reciprocating or diaphragm pump. A swing disc will flutter. Use a spring-assisted valve, fit a pulsation damper, or consult GWG.
- Do not use a check valve to throttle flow, and keep it away from the point where it can run dry or draw air.

5.5 Pre-installation checklist

Tick	Check
☐	The valve model, size and rating match the duty (Section 5.1), including fluid, pressure and temperature.
☐	The duty flow is above the minimum velocity for the valve (Section 5.3).
☐	Straight pipe either side of the valve meets Section 5.4. The valve is not directly on a pump outlet or increaser.
☐	The orientation is permitted for this model (Section 6.1). The flow arrow will point with the flow.
☐	The pipe is clean, flanges are parallel and aligned, and the line is isolated, drained and depressurised.
☐	There is room for the disc to open, and headroom to remove the bonnet or cover later.
☐	New gaskets, bolts and nuts of the correct grade for the flange pattern and fluid are on hand.

6. Valve Installation

6.1 Orientation

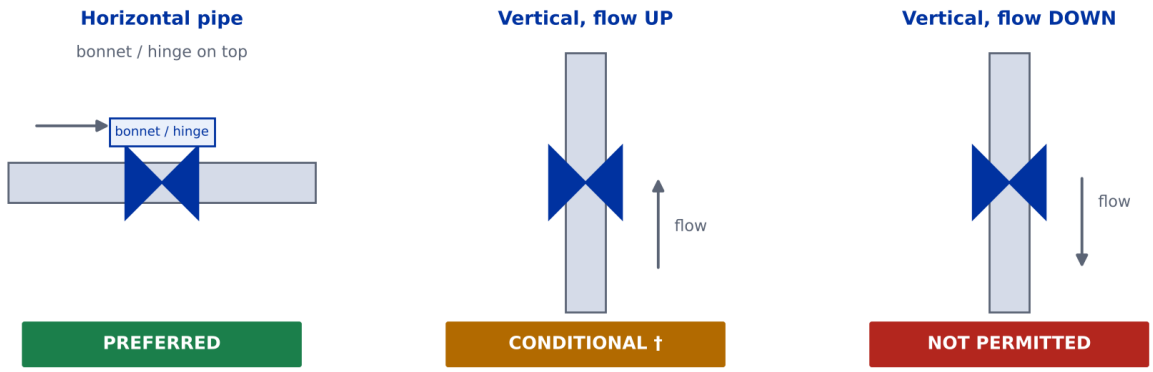


Figure 2 Orientation guide for swing-type valves (see the table for each model)

Model	Horizontal pipe	Vertical, flow up	Vertical, flow down
CVFWA150, CVFWA300, CVFSA150	Yes. Bonnet and hinge on top.	Conditional †. Consult GWG: closing relies on gravity and reverse flow only, and the disc is easily unsettled.	No
CVFRS	Yes. Cover on top †.	Conditional †. Consult GWG.	No
CVWD, CVWDS	Yes. Stem vertical preferred †.	Yes †.	Only after consultation with GWG †.
CVWS	Yes. Hinge and lifting eye at top †.	Conditional †. Consult GWG.	No
CVWSPS	Yes. Hook and hinge at top. Horizontal plane only (data sheet).	No (data sheet).	No (data sheet).

> ⚠ **CAUTION**
>
> **Vertical installation of swing check valves**
>
> The standard swing check valves in this manual have no lever and weight or other damping device. In vertical upward flow the disc closes only by gravity and reverse flow and, at low velocity, can flutter against the hinge and stop. If a swing valve must be fitted in a vertical pipe, confirm the application with GWG first. In vertical lines, spring-assisted valves are usually the better choice †. Some swing check manufacturers offer an external lever and weight for vertical upward flow [5]; this is not an option on the GWG valves in this manual.

6.2 Flow direction

The flow arrow on the body (or the inlet side marking) must point in the direction of normal flow. A valve fitted backwards will not pass flow, and on swing valves will hold the line against the pump.

6.3 Installing flanged valves (CVFWA150, CVFWA300, CVFSA150, CVFRS)

1. Check that the pipe flanges are parallel and aligned, and that the faces are clean and undamaged. Do not use the bolts to pull misaligned pipe together.
2. Support the adjacent pipework so that the valve does not carry pipe load. The valve should hang free of strain.
3. Confirm the flow arrow and orientation (Sections 6.1 and 6.2). For horizontal pipe, the bonnet or cover goes on top.
4. Fit new gaskets suited to the flange facing and the fluid: raised-face flanges on CVFWA150, CVFWA300 and CVFSA150, and AS 2129 Table D or E flanges on CVFRS.
5. Lift the valve with slings around the body and lower it into position between the flanges without forcing it.
6. Fit all bolts and nuts and run them up finger tight. Check that the valve is centred and square to the pipe.
7. Tighten the bolts in a diagonal (star) pattern, in three stages (about 30 %, 60 % then 100 % of the torque specified for the flange, bolt grade and gasket). Re-check all bolts in sequence.
8. On CVFRS, fit the drain plug at the lowest point and make sure it is tight.
9. On CVFRS, use flat full-face gaskets of a soft material. Ring gaskets or excessive bolt torque can crack ductile iron flanges or crush the rubber †. Support the pipe so no load is carried by the valve body.
10. Check that the hinge area and bonnet or cover are clear of obstructions, and that there is room to remove the bonnet later.

6.4 Installing wafer valves (CVWD, CVWDS, CVWS, CVWSPS)

1. Confirm the flange pattern: CVWD and CVWDS suit ANSI 150, AS 4087 PN16 and AS 2129 Table D and E; CVWS suits EN 1092-2 PN16; CVWSPS suits ANSI 150 and DIN PN10 / PN16.
2. Check that the pipe bore, any lining, stub flange or adjacent valve will not obstruct the discs. Dual disc valves swing their discs beyond the face of the body when open. Take particular care with polyethylene stub flanges and lined pipe: confirm that the bore and any chamfer clear the open disc. Allow a short spool between a check valve and a butterfly valve.
3. Confirm the correct orientation (Section 6.1). In horizontal pipe, set CVWS and CVWSPS with the lifting eye or hook and hinge at the top. For CVWD and CVWDS, set the stem vertical †.
4. Insert the lower bolts through the flanges and rest the valve body on them so it is centred. Fit the flange gaskets if the pipe flange pattern requires them †. Add the remaining bolts and nuts.

5. Bring the flanges together evenly. Do not overtighten: excess bolt load can distort a wafer body or crush a rubber seat.
6. Tighten the bolts in a diagonal pattern in three stages to the torque specified for the flange, bolt grade and gasket. Check that the valve body is still centred.
7. Check that the flow arrow points with the flow and that the discs can move freely by hand or with a probe through the open end before final closing up.

6.5 General Installation Notes

> ⚠ **CAUTION**
>
> **Bolting and clearance on wafer valves**
>
> Use bolts of the correct length for the valve face-to-face length. Short bolts do not engage the nuts properly. Never install a wafer check valve where the flange bore, a lining or a stub flange chamfer can foul the disc.

6.6 Post-Installation Field Test

1. Check that the valve is in the correct orientation and that nothing touches the disc or hinge.
2. Fill the line slowly and vent air from the high points before starting any pump.
3. Pressure test the line to the specified test pressure but never above the valve rating or the shell test pressure given in the data sheet (CVWSPS: 2.4 MPa shell, 1.76 MPa seal, API 598).
4. Check the flange joints for leaks and re-check bolt torque after the first pressurisation and again after the first heat cycle on steel valves.
5. Complete the record in Section 10.

7. Commissioning and Operation

7.1 Start-up

1. Check that all isolation valves are in the correct position and the line is full and vented.
2. Start the pump gradually if it is fitted with a soft start or speed control. A rapid ramp-up creates unnecessary surge.
3. Listen at the valve and check the pressure gauge. A steady, quiet flow is normal. Chatter, rattling, banging or a pulsing gauge indicates a problem (Section 8.7).
4. Run at the minimum and normal duty flows and check that the valve is quiet at each.
5. Stop the pump and listen for slam, then check that the line does not drain back and that the pump does not turn backwards.
6. Record the findings in Section 10.

7.2 Normal operation

A check valve operates automatically and needs no adjustment. In normal service it should be quiet, with no vibration at the body, and should close smoothly when flow stops. Do not tighten bolts or cover fasteners while the valve is under pressure.

7.3 Operating limits

Model	Pressure	Temperature	Notes
CVFWA150	0–20 bar	0–220 °C	See 2.2 for temperature derating
CVFWA300	0–50 bar at ambient	315 °C at 38 bar	Raised-face flanges
CVFSA150	0–20 bar	0–220 °C	See 2.2 for temperature derating
CVFRS	PN16 (1600 kPa)	0–80 °C	NBR seat and disc
CVWD, CVWDS	PN16 (1600 kPa)	max 90 °C	NBR seat
CVWS	PN16 (16 bar)	Not stated on data sheet	Confirm temperature and seat on order
CVWSPS	PN16 (16 bar)	−20 to 180 °C	NBR; other seats on request

7.4 Conditions to avoid

⚠ CAUTION

These conditions shorten valve life

- Flow below the minimum velocity in Section 5.3 (the disc hunts in the stream).
- Turbulent or pulsating flow at the valve: too close to a pump, increaser, elbow or control valve.
- Pump stop-start cycling or rapid pump stops that slam the disc.
- Operation above the rated pressure or temperature, or with fluids the seat is not rated for.
- Solids or debris in the flow that can jam the hinge, spring or disc.
- Freezing of liquid trapped in the body.

8. Maintenance

8.1 Routine Schedule

Check valves have moving parts that wear. Inspect them regularly and plan to replace wear parts. The intervals below are typical starting points †. Shorten them for abrasive fluids, pulsating flow, installations close to pumps, and any duty where failure is costly.

Task	Typical interval	What to look for
External check: noise, vibration, leaks, flange condition	Monthly, or each site round	Chatter, rattle, banging; weeping flanges or cover; corrosion or coating damage
Operating check: flow and pressure, pump stop behaviour	Every 3 months	Slam on stop, backflow, pump turning backwards, changed gauge readings
Bolt and gasket check	After first 2 weeks, then yearly	Loose fasteners, leaks
Internal inspection of hinge, pin, disc, seat or spring	Yearly; 3–6 months in severe duty	Wear on hinge pin and bore, disc play, seat damage, spring condition, debris
Replace seals, gaskets, springs and seat O-rings	At each internal inspection, or when damaged	Hard, cracked, compressed or torn rubber; broken springs

8.2 Before maintenance

> ⚠ **WARNING**
>
> Follow Section 2.1. Isolate both sides of the valve, release the pressure, drain the line and apply lock-out. If the valve has handled a hazardous fluid, flush and decontaminate it before opening. Mark the valve orientation and flow direction on the pipe before removing it.

8.3 Swing check valves: CVFWA150, CVFWA300, CVFSA150

The part numbers refer to the parts lists in Section 3 and the sectional drawings in Appendix B.

8.3.1 Dismantling

1. Isolate and drain the line (Section 8.2). Support the valve if it is to stay in the pipe.
2. Slacken the bonnet nuts in a diagonal sequence and remove the bonnet bolts and nuts. Lift the bonnet clear (it is heavy on larger sizes).
3. Lift out the hinge assembly, with the disc attached, and note how the hinge, support and hinge pin fit together.
4. Withdraw the hinge pin and separate the hinge, disc and support. Keep parts together and labelled.
5. Remove the old bonnet gasket and clean the gasket faces without scoring them.

8.3.2 Inspecting

- **Hinge pin and hinge bore:** look for polishing, scoring, flats, ovality or a loose fit. Wear here is the usual sign of flutter in service. Replace the pin and hinge if worn.
- **Disc and disc nut:** check that the disc nut and its locking pin or washer are present and tight. Check the disc for cracks, pitting and damaged seating face. A disc that sags or sits out of square on the seat has worn at the hinge.
- **Seat:** examine the body seat for wear, grooves or impact marks. Light marks can be lapped; deep damage means replacing the body or valve.
- **Stops and body:** look for peening or impact marks where the disc hits the stop or body, which show chatter or slamming.
- **Gaskets:** replace the bonnet gasket at every opening.

> ⚠ **NOTE**
>
> **Use what the wear tells you**
>
> Wear is evidence. Polished flats on the hinge pin and elongated bores point to flutter from low velocity or turbulence. Peening on the stop points to chatter or slam. Seat damage on one side only points to a disc that has dropped on the hinge. Record the pattern and correct the cause (Section 8.7); replacing the parts alone will not stop it happening again.

8.3.3 Reassembly

1. Fit the replacement parts. Use only GWG parts or parts to the materials listed in Section 3. Do not substitute a different pin or bolting material.
2. Assemble the hinge, disc and support, and check that the disc swings freely through its full arc and lands squarely on the seat.

3. Fit a new bonnet gasket and the bonnet. Tighten the bonnet bolts in a diagonal pattern, in stages, to the required torque.
4. Return the valve to service following Sections 6.6 and 7.1, and record the work in Section 10.

8.4 Swing flex check: CVFRS

The swing flex valve has no scheduled lubrication and can be opened for inspection without removing it from the line. Inspect it at least once a year, and more often on slurry, sand or other abrasive duties.

> ⚠ **WARNING**
>
> **Drain and depressurise first**
>
> The line must be isolated, drained and depressurised before the cover bolts are loosened. Opening the cover under pressure can release the contents and cause serious injury. Do not lift the valve by the cover.

1. Isolate and drain the line. Remove the drain plug and let the body drain.
2. Mark the cover and body so the cover is refitted the same way round. Remove the cover bolts evenly and lift off the cover.
3. Lift out the disc assembly together with the core rod. Note which way round the disc sits.
4. Inspect the NBR-encapsulated disc for cuts, tears, swelling, hardening, flattened sealing bead or loss of bonding to the iron core. Replace the disc if the rubber is damaged or the valve has been leaking back.
5. Inspect the core rod and hinge area for wear and the body for packed solids or scale. Clean out debris with a soft tool so the rubber seat is not cut.
6. Inspect the vulcanised NBR seat. It is bonded into the body; if it is cut, torn or lifting, contact GWG.
7. Replace the NBR cover gasket. Wipe the seat and disc clean, refit the disc the right way round, refit the cover and bolts and tighten diagonally in stages. Bolt torque is not on the data sheet; get it from GWG.
8. Refit the drain plug. Return the valve to service following Sections 6.6 and 7.1 and record the work in Section 10.

> ⚠ **NOTE**
>
> **Rubber care**
>
> Use only a lubricant or grease that is compatible with NBR on the seat and disc. Keep petroleum solvents off the rubber. A thin film of food-grade grease on the sealing bead helps the disc seat on refitting.

8.5 Wafer valves: CVWD, CVWDS, CVWS, CVWSPS

1. Isolate and drain the line, relax the flange bolts and remove the valve. Support the pipe while the valve is out.
2. Inspect the discs, stem or hinge pin, and spring. On CVWD and CVWDS, check the discs, stem, PTFE washers, O-ring, hex nuts and NBR seat. On CVWS and CVWSPS, check the disc, hinge arm and pin, spring, screws and NBR seat or O-ring.
3. Check that the spring is not cracked, broken or set, and that the discs close fully and spring back freely when pushed open by hand.
4. Check the seat for cuts, hardening, swelling or deformation, and the disc faces for scoring.
5. Replace worn parts as a set. Where a wafer valve cannot be dismantled in the field, replace it as an assembly or return it to GWG.

6. Refit following Section 6.4.

8.6 Keep a Record

Log each inspection in Section 10: date, operating conditions, what was found, which parts were replaced and any change to the installation. A trend in wear, for example hinge pin wear increasing at each inspection, is the earliest warning that the duty or layout is wrong.

8.7 Fault Finding

Symptom	Likely Cause	Corrective Action
Chatter, rattling or banging while running	Flow below minimum velocity; valve oversized; turbulence from a pump, increaser, elbow or valve too close; pulsating flow	Check duty flow against Section 5.3. Increase straight pipe (Section 5.4). Use a smaller or spring-assisted valve. Inspect hinge pin for wear.
Slam or hammer when the pump stops	Slow-closing swing disc in a high-head or long main; reverse velocity builds up before the disc seats	Assess surge (Section 2.3). Use a spring-assisted valve or slow pump run-down; consider surge protection.
Flow reverses; pump spins backwards	Disc not seating: worn or broken hinge pin or nut, debris, damaged seat, disc jammed open	Stop and isolate. Inspect and repair (Section 8). Check for broken parts that may have travelled downstream.
Leakage across the seat when closed	Debris on the seat, worn or damaged seat or disc, hardened rubber, very low back pressure	Flush and inspect. Replace seat, disc or O-ring. Check the minimum sealing pressure with GWG.
Disc stuck open or hinge jammed	Worn or fractured hinge pin, broken disc nut, debris, solids, damaged stop	Isolate and dismantle. Replace worn parts and find the cause of wear (see first row). Retain failed parts for evidence.
High pressure drop or low flow	Disc not fully open at low flow; blockage; valve too small; wrong installation	Check flow and size. Remove debris. Compare with the data in Section 5.3.
External leakage at flanges, bonnet or cover	Loose or uneven bolting, damaged or wrong gasket, misaligned flanges	Isolate and re-gasket. Tighten in sequence. Realign the pipe.
Repeated short life of hinge pin or disc	Installation too close to pump or fittings, oversized valve, pulsating flow, unsuitable valve type for the duty	Re-assess the layout and selection with GWG. Move the valve, resize it or change type.

9. Spares, Warranty and Support

9.1 Ordering spare parts

Quote the model code, size, serial number or body markings, and the item number and name from the parts list in Section 3. Typical spares to hold are gaskets, seat O-rings and seats, springs, and hinge pin and disc nut sets. Use only GWG or GWG-approved parts, because a substitute material can change how the valve wears.

9.2 Warranty and returns

Warranty on GWG valves is covered by GWG's terms and conditions of sale. To assess a claim, GWG will need:

- The model, size, serial number or body markings and the date of purchase and installation.
- Photographs showing how the valve is installed: the pipework either side, the orientation and the pump outlet.
- The duty: fluid, flow rate, pressure, temperature, pump type and model, running hours and start-stop frequency.
- A description of the failure, with dates and any damage to other equipment.

- The valve itself, returned in its as-failed condition. Do not clean, dismantle or repair it before GWG has seen it [6][7].

Operating a valve outside its published limits, or contrary to this manual, may affect the assessment of a claim.

9.3 Contact

Global Water Group (GWG Poly), 36 Hub Crescent, Heathwood QLD 4110 · +61 7 3517 5595 · sales@globalwatergroup.com · globalwatergroup.com

10. GWG Installation and Inspection Record

Complete this record at installation and at every inspection, and retain it with the valve documentation or plant maintenance records. Include a copy with any valve returned to GWG.

> ⚠ **NOTE**
> Keep the original with the plant maintenance records. Return a copy to: GWG Poly Technical — sales@globalwatergroup.com — +61 7 3517 5595

10.1 Valve details

Model and Size (DN)	
Serial No. / Body Markings	
Location / Tag	
Fluid, Temperature	
Pump Model, Duty Flow and Head	
Orientation	Horizontal / Vertical flow up (circle one)
Straight Pipe Upstream / Downstream (× DN)	
Date Installed	
Installed By	

10.2 Commissioning checklist

Done	Check
☐	Flow arrow points with the flow; orientation correct.
☐	Flange bolts tightened in sequence and re-checked.
☐	Line filled slowly and vented.
☐	Quiet operation at normal and minimum flow.
☐	No slam and no reverse rotation on pump stop.
☐	No leaks at flanges, bonnet or cover.

10.3 Inspection log

Date	Inspector	Findings (wear, noise, leaks)	Parts Replaced	Next Due

Appendix A — Quick Reference: Critical Steps

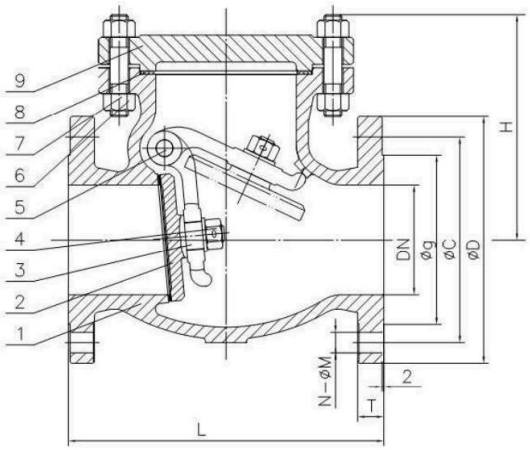
Task	Critical Requirement
All installations	Flow arrow points with the flow; orientation checked against Section 6.1
Swing check valves (CVFWA150, CVFWA300, CVFSA150, CVFRS)	Keep flow velocity at or above about 2.3 m/s † (Section 5.3)
Spring-assisted wafer valves (CVWD, CVWDS, CVWS, CVWSPS)	Keep flow velocity at or above about 1.2 m/s † (Section 5.3)
Pump discharge	Never fit a swing check directly on the pump outlet or an increaser; allow 10 × DN straight pipe preferred, 5 × DN minimum † (Section 5.4)
CVWSPS	Horizontal plane only (data sheet)
Wafer valves	Check disc clearance against the pipe bore, lining and stub flange chamfer before fitting
All installations	No welding or heat on or near the valve while fitted
All installations	Cross-pattern bolt tightening in stages to the specified torque
Pressure test	Never above the valve rating or the shell test pressure on the data sheet
Pump stop	Listen for slam; check the pump does not turn backwards (Section 7.1)
Repeated hinge pin or disc failure	Treat as a layout or duty problem; check flow and straight pipe before replacing parts (Section 8.7)
Failed valve	Do not clean, dismantle or repair before GWG has seen it; keep failed parts
Any inspection or repair	Complete the Installation and Inspection Record (Section 10)

Appendix B — Model Drawings and Dimensions

Sectional drawings, part numbers and dimensions are transcribed from the GWG product data sheets (rev 09/2026). Part numbers refer to the parts lists in Section 3. Dimensions are in millimetres; weights are in kilograms.

B.1 CVFWA150 — Flanged WCB Swing Check Valve, ANSI 150





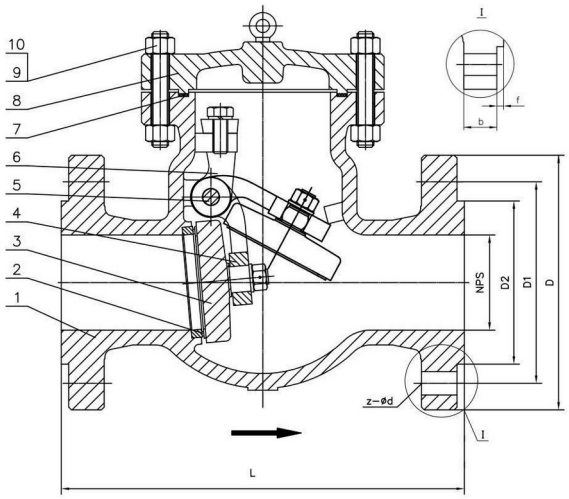
B.1.1 CVFWA150 Dimensions and Weights

Code	DN	Flange	D	C	G	T	L	H	N-M	kg
CVFWA150-050	50	ANSI 150	152	120.5	92	15.9	203	155	4-19	12
CVFWA150-065	65	ANSI 150	178	139.5	105	17.5	216	165	4-19	15
CVFWA150-080	80	ANSI 150	190	152.5	127	19.1	241	185	4-19	21
CVFWA150-100	100	ANSI 150	229	190.5	157	23.9	292	196	8-19	36
CVFWA150-125	125	ANSI 150	254	216	186	23.9	330	202	8-22	47
CVFWA150-150	150	ANSI 150	279	241.5	216	25.4	356	225	8-22	61
CVFWA150-200	200	ANSI 150	343	298.5	270	28.6	495	263	8-22	109
CVFWA150-250	250	ANSI 150	406	362	324	30.2	622	285	12-25	200
CVFWA150-300	300	ANSI 150	483	432	381	31.8	698	320	12-25	270

Millimetres. L face-to-face, D flange OD, C bolt circle, G raised face, T flange thickness, H overall height, N-M number and diameter of bolt holes.

B.2 CVFWA300 — Flanged WCB Swing Check Valve, ANSI 300





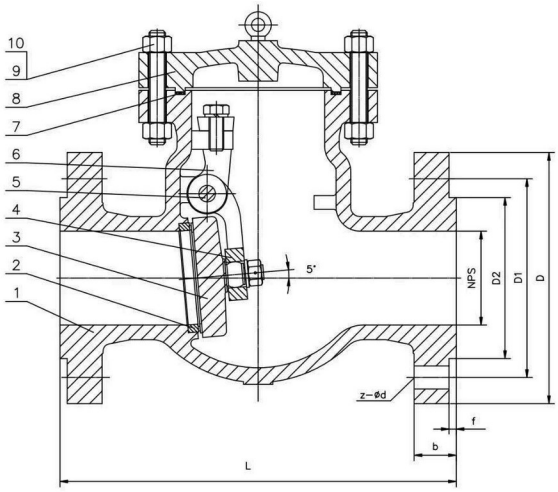
B.2.1 CVFWA300 Dimensions and Weights

Model	NPS	L	D	D1	D2	b	f	z-ød	kg
CVFWA300-050	2"	267	165	127	92.1	20.7	2	8-19	16
CVFWA300-065	2-1/2"	292	190	149.2	104.8	23.9	2	8-22	23
CVFWA300-080	3"	318	210	168.3	127	27	2	8-22	29
CVFWA300-100	4"	356	255	200	157.2	30.2	2	8-22	46
CVFWA300-150	6"	445	320	269.9	215.9	35	2	12-22	82
CVFWA300-200	8"	533	380	330.2	269.9	39.7	2	12-26	136
CVFWA300-250	10"	622	445	387.4	323.8	46.1	2	16-29	204
CVFWA300-300	12"	711	520	450.8	381	49.3	2	16-32	302

Millimetres unless specified. L face-to-face, D flange OD, D1 bolt circle, D2 raised face, b flange thickness, f raised face height, z-ød number and diameter of bolt holes. Weights from the product data sheet.

B.3 CVFSA150 — Flanged Stainless Steel Swing Check Valve, ANSI 150





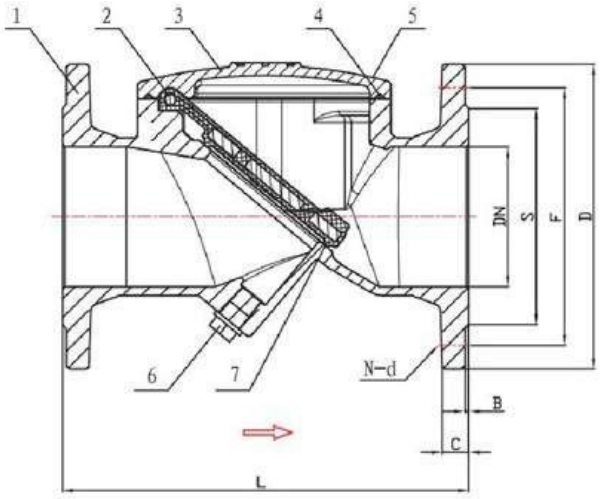
B.3.1 CVFSA150 Dimensions and Weights

Model	NPS	L	D	D1	D2	b	f	z-d	kg
CVFSA150-050	2"	203	150	120.7	92.1	16.3	2	4-19	12
CVFSA150-065	2 1/2"	216	180	139.7	104.8	17.9	2	4-19	15
CVFSA150-080	3"	241	190	152.4	127	19.5	2	4-19	21
CVFSA150-100	4"	292	230	190.5	157.2	24.3	2	8-19	36
CVFSA150-150	6"	356	280	241.3	215.9	25.9	2	8-22	61
CVFSA150-200	8"	495	345	298.5	269.9	29	2	8-22	109
CVFSA150-250	10"	622	405	362	323.8	30.6	2	12-26	200
CVFSA150-300	12"	699	485	431.8	381	32.2	2	12-26	270

Millimetres unless shown otherwise. L face-to-face, D flange OD, D1 bolt circle, D2 raised face, b flange thickness, f raised face height, z-d number and diameter of bolt holes. Weights from the product data sheet. A DN125 (47 kg) is listed on page 1 of the data sheet but not in its dimension table.

B.4 CVFRS — Flanged Swing Flex Check Valve, PN16





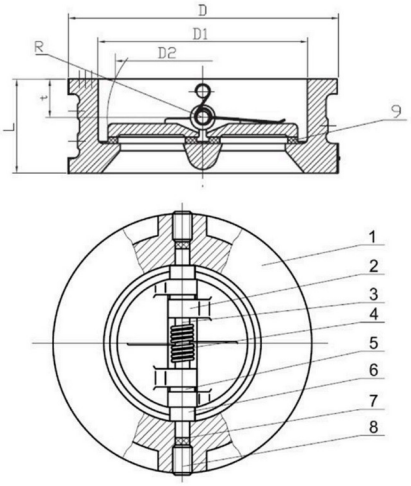
B.4.1 CVFRS Dimensions and Weights

Code	DN	Flange	S	F	D	B	C	L	N-d	kg
CVFRSE050	50	Table D/E	99	125	165	3	19	203	4-18	—
CVFRSE065	65	Table D/E	118	145	185	3	19	216	4-18	—
CVFRSE080	80	Table D/E	132	160	200	3	19	241	4-18	15
CVFRSE100	100	Table D/E	156	180	220	3	19	292	8-18	21
CVFRSE150	150	Table D/E	211	240	285	3	19	356	8-22	40
CVFRSE200	200	Table D/E	266	295	340	3	20	495	8-22	76
CVFRSE250	250	Table D/E	319	355	405	3	22	622	12-22	122
CVFRSE300	300	Table D/E	370	410	460	4	24.5	698	12-26	218
CVFRSD100	100	Table D	156	180	220	3	19	292	4-18	21
CVFRSD250	250	Table D	319	355	405	3	22	622	8-22	122

Millimetres. L face-to-face, D flange OD, F bolt circle, S seat bore, B / C flange detail, N-d number and diameter of bolt holes.

B.5 CVWD — Dual Disc Wafer Check Valve, PN16





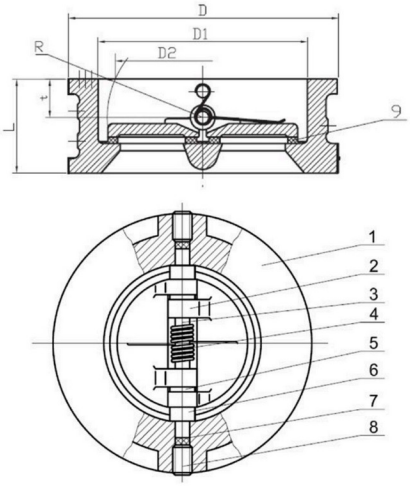
B.5.1 CVWD Dimensions and Weights

Code	DN	L	D	D1	D2	kg
CVWDN050	50	43	98	65	46	1.3
CVWDN065	65	46	110	80	60	2.1
CVWDN080	80	64	128	94	70	2.9
CVWDN100	100	64	156	117	88	4.3
CVWDN125	125	70	187	145	115	6.4
CVWDN150	150	76	213	171	134	9.1
CVWDN200	200	89	267	224	182	15.2
CVWDN250	250	114	328	265	220	26.5
CVWDN300	300	114	375	310	260	37
CVWDN350	350	127	444	360	298	55
CVWDN400	400	140	495	410	350	80
CVWDN450	450	152	558	450	385	101
CVWDN500	500	152	615	505	438	114
CVWDN600	600	178	727	624	538	172

Millimetres. L face-to-face, D body OD, D1 seat OD, D2 disc OD.

B.6 CVWDS — Stainless Steel Dual Disc Wafer Check Valve, PN16





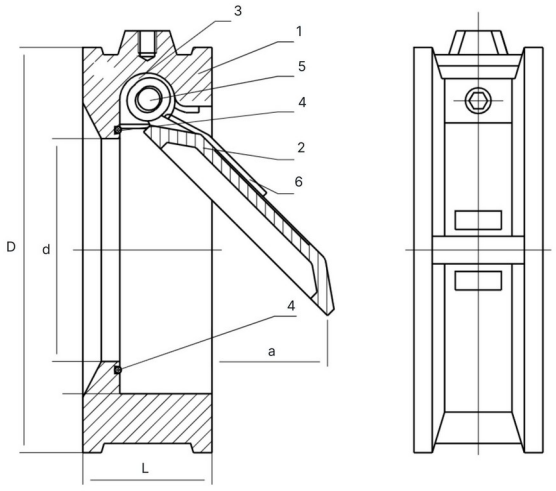
B.6.1 CVWDS Dimensions and Weights

Code	DN	L	D	D1	D2	kg
CVWDS050	50	43	98	65	46	1.3
CVWDS065	65	46	110	80	60	2.1
CVWDS080	80	64	128	94	70	2.9
CVWDS100	100	64	156	117	88	4.3
CVWDS125	125	70	187	145	115	6.4
CVWDS150	150	76	213	171	134	9.1
CVWDS200	200	89	267	224	182	15.2
CVWDS250	250	114	328	265	220	26.5
CVWDS300	300	114	375	310	260	37
CVWDS350	350	127	444	360	298	55
CVWDS400	400	140	495	410	350	80
CVWDS450	450	152	558	450	385	101
CVWDS500	500	152	615	505	438	114
CVWDS600	600	178	727	624	538	172

Millimetres. L face-to-face, D body OD, D1 seat OD, D2 disc OD.

B.7 CVWS — Single Disc Wafer Check Valve, PN16





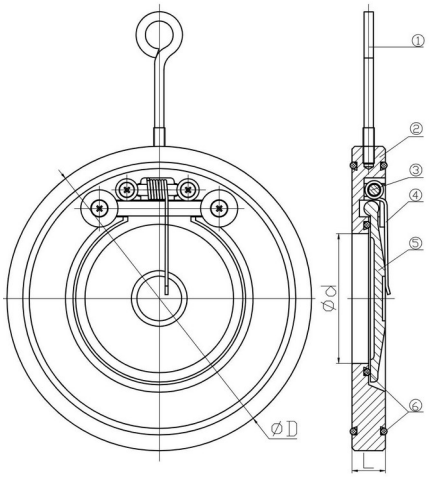
B.7.1 CVWS Dimensions and Weights

DN	L	D (EN 1092-2 PN16)	a	d
50	44.5	106	29	33
65	48	126	30	47
80	51	141	56	52
100	57	161	75	76
125	63.5	191	95	95
150	70	217	114	121
200	73	272	156	168
250	79	337	187	194
300	86	382	222	241
350	108	446	229	267
400	108	515	248	318
450	108	550	300	356
500	140	610	324	387
600	152	733	387	423

Millimetres. L face-to-face, D body OD, a seat face, d seat bore.

B.8 CVWSPS — Stainless Steel Wafer Swing Check Valve, PN16





B.8.1 CVWSPS Dimensions and Weights

Part no.	Size	L	Ø d	Ø D (PN16)
CVWSPS050	DN50	14	32	107
CVWSPS065	DN65	14	40	127
CVWSPS080	DN80	14	54	142
CVWSPS100	DN100	18	70	162
CVWSPS125	DN125	18	92	192
CVWSPS150	DN150	20	112	218
CVWSPS200	DN200	22	154	272
CVWSPS250	DN250	26	200	328
CVWSPS300	DN300	32	240	378
CVWSPS350	DN350	38	270	447
CVWSPS400	DN400	44	310	495
CVWSPS450	DN450	44	360	557
CVWSPS500	DN500	56	405	619
CVWSPS600	DN600	62	585	734

Millimetres. L face-to-face, Ø d seat bore, Ø D body OD.

Appendix C — References

The guidance in Sections 5 and 6 draws on the sources below. Where a figure is marked † in the text it is industry guidance from these sources, not a GWG test result.

C.1 Sources

No.	Source	Used for
[1]	**GWG product data sheets, rev 09/2026**: CVFRS, CVFSA150, CVFWA150, CVFWA300, CVWD, CVWDS, CVWS, CVWSPS. Global Water Group.	All model data, ratings, materials, parts lists, drawings and dimensions (Sections 1, 3 and 5.1, Appendix B).
[2]	**Milwaukee Valve Company**, Check Valve Minimum Velocity and Installation Location Guidelines, Technical Bulletin MVTB-21-001, rev. 28 June 2021. milwaukeevalve.com/wp-content/uploads/mvtb-21-001-check-valve-minimum-velocity-and-installation-location-guidelines.pdf	Minimum velocity: 7.5 ft/s for water through swing checks ($60\sqrt{V}$ for other fluids, V in ft^3/lb) and 4 ft/s for silent (spring-loaded) types. Straight pipe downstream of pumps and other turbulence: 10 to 12 pipe diameters for swing types, 4 to 5 for silent types (Sections 5.3, 5.4).
[3]	**MSS SP-92**, MSS Valve User Guide, Manufacturers Standardization Society of the Valve and Fittings Industry. Not reviewed directly (purchased standard). Its recommendations are taken as quoted in [4] and [5].	Straight pipe of 10 pipe diameters from tees, fittings, increasers or pumps, and 5 from elbows (Section 5.4).
[4]	**DeZURIK**, Check Valve Installation Tips to Maximize Process Performance, 14 March 2025. dezurik.com/news/check-valve-installation-considerations-to-maximize-process-performance/	Quotes the MSS SP-92 distances: 10 diameters from pumps, tees and increasers (5 has performed acceptably where space is short), and 5 from elbows (3 acceptable). Purpose is to reduce disc movement and premature wear (Section 5.4).
[5]	**DeZURIK**, Instruction D12003, APCO CVS-250/250A Swing Check Valves, March 2023. dezurik.com/wp-content/uploads/2024/10/D12003.pdf	Example of a manufacturer that supports vertical upward flow and supplies a counterweight arm on its swing checks; cites MSS SP-92 for pump distances (Sections 5.4, 6.1).
[6]	**US Nuclear Regulatory Commission**, Information Notice 81-35, Check Valve Failures, 2 December 1981. nrc.gov/documents-reports/generic-communications/information-notices/1981/in81035	Background to Sections 8.7 and 9.2: check valve failures can come from retaining-device design and assembly quality control as well as from the installation, so retain failed parts for examination.
[7]	**US Nuclear Regulatory Commission**, Information Notice 82-20, Check Valve Problems, 28 June 1982. nrc.gov/documents-reports/generic-communications/information-notices/1982/in82020	As [6]: internal damage to swing check valves and disc, hinge and stud failures reported in service.

> ⚠ **NOTE**
>
> **About these sources**
>
> References [2] to [5] are manufacturer and industry guidance. References [6] and [7] are nuclear plant operating experience and are used only as general background on how check valves fail. None of them is GWG test data, and they have not been checked against the GWG valves. Web addresses were checked in October 2026.

C.2 Standards named on the GWG data sheets

The standards are listed as they appear on the data sheets. The data sheets do not state the edition, so confirm the current edition before quoting one in a specification.

Standard	Subject	Models
ASME B16.5	Pipe flanges and flanged fittings	CVFWA150, CVFWA300, CVFSA150
ASME B16.10	Face-to-face and end-to-end dimensions of valves	CVFWA150, CVFWA300, CVFSA150
ASME B16.34	Valves: flanged, threaded and welding end (pressure-temperature ratings)	CVFSA150
API 594	Check valves: flanged, lug, wafer and butt-welding	CVFWA300
API 598	Valve inspection and testing	CVFWA150, CVFWA300, CVFSA150, CVWD, CVWDS, CVWSPS
API 609	Butterfly valves: double-flanged, lug- and wafer-type (face-to-face dimensions)	CVWD, CVWDS
BS 1868	Steel check valves (flanged and butt-welding ends) for the petroleum, petrochemical and allied industries	CVFWA150
AS 2129	Flanges for pipes, valves and fittings (Table D / E)	CVFRS
EN 1092-2	Flanges and their joints: cast iron flanges (drilling)	CVWS
DIN 3202-K3	Face-to-face dimensions of valves (series K3)	CVWS, CVWSPS