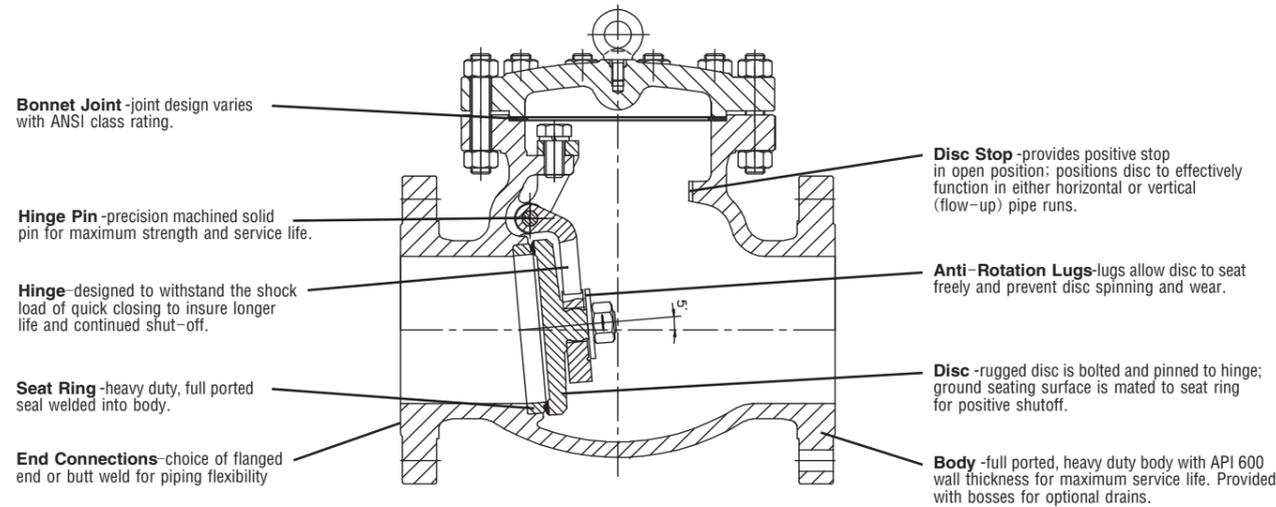


Cast Steel Bolted Bonnet Valves



Swing Check Valve Major Features

All Pacific cast steel bolted bonnet swing check valves are available in a complete range of body/bonnet materials. The valves are designed to provide fast check valve action and maximum service life. All swing check valves are full ported, have full API 600 wall thickness, and meet the design requirements of ANSI B16.34.



Range of Materials

Standard body/bonnet materials include nine grades of carbon, low alloy and stainless steels. For special applications, they can be supplied in other grades of alloy and stainless steel. There's a full range of trim materials to match any service. Standard and optional gaskets are available for a wide variety of service conditions.

Reliable Operation

Valves are designed to close quickly with positive shutoff in either horizontal or vertical (flow up) pipe runs. The body seat ring is installed on a 3° angle. This allows our swing check valve to close completely even when installed in a horizontal pipe run with no flow.

Easy Maintenance

Our bolted bonnet design is simple to disassemble, easy to maintain. For example, our unique threaded seat rings are easily accessible for repair or replacement.

Longer Life

Our rugged hinge pin/hinge and disc construction is designed to withstand the shock of quick closing and provides years of service. Anti-rotation lugs on discs extend service life in turbulent, high velocity services which can otherwise cause spinning and wear.

Sizing Swing Check Valves

Three factors should be considered when sizing swing check valves: the pressure drop across the valve, the flow velocity of the fluid through the valve, and the location of the valve in relation to other piping components.

For best performance swing check valves should operate with fluid velocity sufficient to hold the disc in a stable position off the seat or fully open against the disc stop. Extremely high velocities should be avoided due to possible cavitation. In addition, there is a mid-range of velocity where the disc may become unstable as it approaches the disc stop. Operation in these velocity ranges should be avoided to achieve best performance and valve life.

Calculating Pressure Drop

Please refer to "Flow Calculations" in the Technical Data section for swing check valve flow coefficient (Cv) and equations to calculate pressure drop through the valve.

Calculating Velocity

Velocity equations are included in the Technical Data Section. When sizing swing check valves, the seat port velocity should be controlled within the general ranges specified below.

$0\sqrt{v} - 55\sqrt{v}$ - Avoid this range.

$55\sqrt{v} - 240\sqrt{v}$ - Generally optimum operating velocity range (See note).

Over $240\sqrt{v}$ - Avoid this range.

Where: v = The specific volume in ft^3/lb of the fluid flowing.

Note: There is an intermediate operating velocity within this range at which the disc may become unstable. This non-optimum operating velocity range is generally from $115\sqrt{v}$ to $135\sqrt{v}$, however, upstream piping components placed in close proximity to the valve will tend to increase this range.

Influence of Valve Position

Swing check valves can be adversely affected by turbulence if placed too closely to other piping components such as pumps, control valves, meters, reducers, tees, elbows, etc. In general a minimum of 10 pipe diameters of straight pipe should be provided upstream of a swing check valve to minimize adverse conditions.



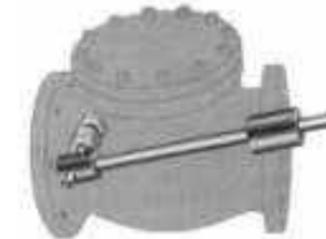
Cast Steel Bolted Bonnet Valves

Swing Check Valves Optional Features



Anti-rotation Disc

Two integrally cast lugs on the disc prevent the disc from spinning in service. This exclusive feature helps extend valve life in difficult services by eliminating disc spinning.



Outside Lever and Weight

All external hinge pin swing check valves 12" and smaller are available with an optional outside lever and weight. This feature can be used to either dampen or assist closing of the check valve disc depending on orientation. By using the lever and weight to counter-balance the disc, the valve opens at lower flow rates. By orienting the weight to add to the disc weight, the weight closes the valve faster. Please specify which orientation is desired when requesting this feature.



Optional Seat Types

Heavy duty, full ported seat rings have controlled seat width to provide maximum sealing force. Our optional threaded design allows simple, low cost replacement. For high temperature service, seat rings should be lock welded or seal welded. Please specify. Seat ring facings are available in many materials, including Co-Cr-A alloy hardfacing, commonly specified for its excellent resistance to wear and damage. See page 38 for available trims.

Standard Bonnet Joints

Body/bonnet joints on designed for rugged services with a more than adequate number of bonnet bolts. The standard joint varies, depending on valve class. These standard joints are shown.



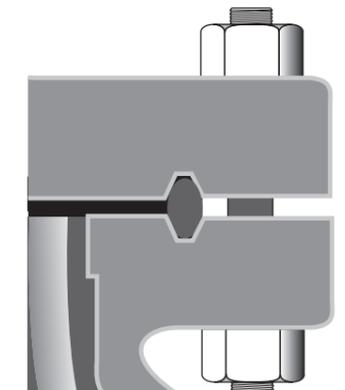
Class 150

Standard joint is a circular male and female configuration with a corrugated metal gasket. The male and female joint confines the gasket O.D and I.D. When specified, gaskets of other materials are available as an option.



Class 300

The circular male and female bonnet joint is self-aligning and encapsulates the gasket. Our standard gasket is double jacketed metal. Valves in these classes are also available with spiral wound or ring joint gaskets when specified.



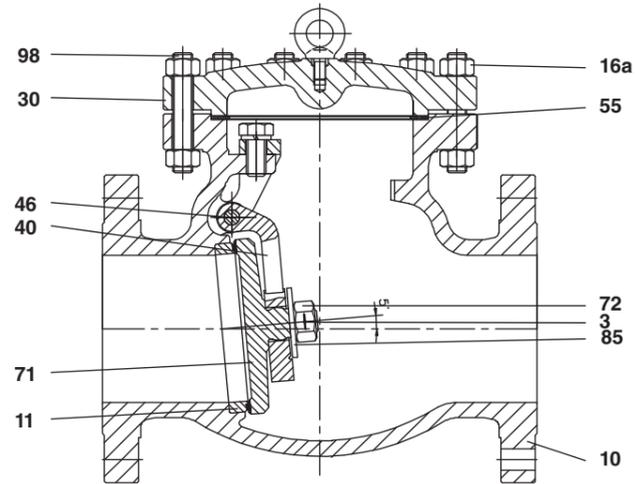
Class 600, 900 and 1500

The circular ring joint bonnet seal has proven to be the best bolted high pressure bonnet joint available. The ring joint is self-aligning; the gasket may be reused unless it is physically damaged. Valves in these classes are also available with spiral wound gaskets when specified.

Cast Steel Bolted Bonnet Valves



Materials of Construction: Swing Check Valves



Item	Part Name
46	Hinge Pin
72	Disc Nut
3	Disc Nut Pin
85	Disc Washer
71	Disc (See Note 1)
11	Seat Ring (See Note 1)

See below for balance

Note 1: Disc and seat ring may either be solid facing material or a base material equal to or better than the body/bonnet material with facing as shown.

Part Name	Carbon Steel	LCB	LC3	WC6	WC9
13 Pipe Plugs	ASTM A108 Gr 1018	ASTM A276 Gr 304	ASTM A276 Gr 304	ASTM A582 Gr 416	ASTM A582 Gr 416
40 Hinge	ASTM A216 Gr WCB	ASTM A351 Gr CF8M			
30 Bonnet Cap	ASTM A216 Gr WCB	ASTM A352 Gr LCB	ASTM A352 Gr LC3	ASTM A217 Gr WC6	ASTM A217 Gr WC9
55 Bonnet Gasket Class 150 & 300 Class 600 & up	Mild Steel Steel ring	Corr. 304 SS 304 SS ring	Corr. 304 SS 304 SS ring	Corr. 304 SS 304 SS ring	Corr. 304 SS 304 SS ring
16b Bonnet stud nuts	ASTM A194 Gr 2H	ASTM A194 Gr 7	ASTM A194 Gr 7	ASTM A194 Gr 2H	ASTM A194 Gr 2H
98 Bonnet Studs	ASTM A193 Gr B7	ASTM A320 Gr L7	ASTM A320 Gr L7	ASTM A193 Gr B7 (B)	ASTM A193 Gr B7 (B)
10 Body	ASTM A216 Gr WCB	ASTM A352 Gr LCB	ASTM A352 Gr LC3	ASTM A217 Gr WC6	ASTM A217 Gr WC9
Part Name	C5	C12	CA6NM	CF8C	CF8M
13 Pipe Plugs	ASTM A582 Gr 416	ASTM A582 Gr 416	ASTM A582 Gr 416	ASTM A276 Gr 316	ASTM A276 Gr 316
40 Hinge	ASTM A351 Gr CF8M	ASTM A351 Gr CF8M	ASTM A351 Gr CF8M	ASTM A351 Gr CF8C	ASTM A351 Gr CF8M
30 Bonnet Cap	ASTM A217 Gr C5	ASTM A217 Gr C12	ASTM A487 Gr CA6NM	ASTM A351 Gr CF8C	ASTM A351 Gr CF8M
55 Bonnet Gasket Class 150 & 300 Class 600 & up	Corr. 304 SS 304 SS ring	Corr. 304 SS 304 SS ring	Corr. 304 SS 304 SS ring	Corr. 347 SS 347 SS ring	Corr. 316 SS 316 SS ring
16b Bonnet stud nuts	ASTM A194 Gr 2H (C)	ASTM A194 Gr 2H (C)	ASTM A194 Gr 2H	ASTM A194 Gr 2H (D)	ASTM A194 Gr 2H (E)
98 Bonnet Studs	ASTM A193 Gr B7 (C)	ASTM A193 Gr B7 (C)	ASTM A193 Gr B7	ASTM A193 Gr B7 (D)	ASTM A193 Gr B7 (E)
10 Body	ASTM A217 Gr C5	ASTM A217 Gr C12	ASTM A487 Gr CA6NM	ASTM A351 Gr CF8C	ASTM A351 Gr CF8M

- (A) Limits std. const. to +500°F.
- (B) Limits std. const. to +1000°F Special const. for max. temp. between +1000°F and +1100°F available on application.
- (C) Limits std. const. to +1000°F Special const. for max. temp. between +1000°F and +1200°F available on application.
- (D) Limits std. const. to temp. between -20°F and +1000°F. Special const. for temp. between +1000°F and +1200°F available on application.
- (E) Limits std. const. to temp. between -20°F and +1000°F. Special const. or lower temp or temp. between +1000°F and +1200°F available on application.

THE RIGHT IS RESERVED TO CHANGE OR MODIFY PRODUCT DESIGN OR CONSTRUCTION WITHOUT PRIOR NOTICE AND WITHOUT INCURRING ANY OBLIGATION TO MAKE SUCH CHANGES AND MODIFICATIONS ON PRODUCTS PREVIOUSLY OR SUBSEQUENTLY SOLD.

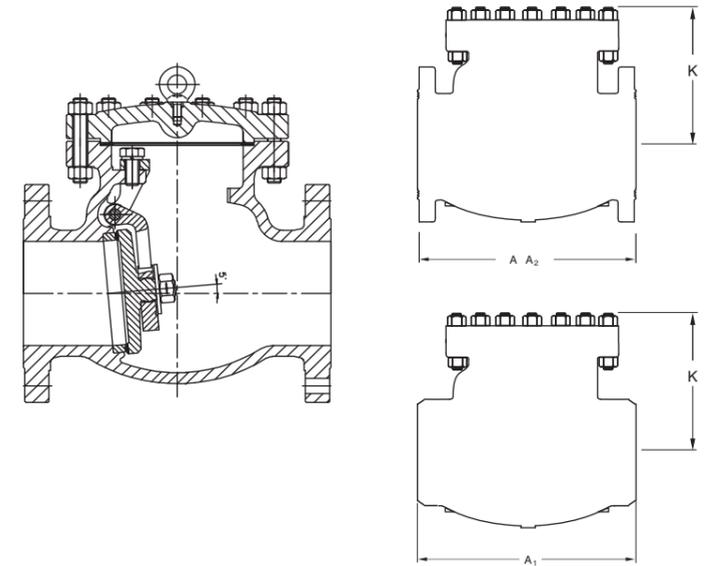


Cast Steel Bolted Bonnet Valves

Swing Check Valves • ANSI Class 150

FEATURES

- Full range of body/bonnet materials
- Full range of trim materials
- Anti-rotation disc
- Flanged or butt weld ends
- Full port design – API wall thickness
- Renewable seat rings seal welded
- Horizontal or vertical service
- Male and female bonnet joint
- Corrugated metal bonnet gasket
- Meet design requirements of ANSI B16.5 and B16.34



DIMENSIONS and WEIGHTS

Dim	Description	VALVE SIZES (inches)															
		1.5	2	2.5	3	4	6	8	10	12	14	16	18	20	24	30	
A	Face to Face Flanged Ends	in.	6.50	8.00	8.50	9.50	11.50	14.00	19.50	24.50	27.50	31.00	34.00	38.50	38.50	51.00	60.00
		mm	165	203	216	241	292	356	495	622	699	787	864	978	978	1295	1524
A ₁	End to End Weld Ends	in.	6.50	8.00	8.50	9.50	11.50	14.00	19.50	24.50	27.50	31.00	34.00	38.50	38.50	51.00	60.00
		mm	165	203	216	241	292	356	495	622	699	787	864	978	978	1295	1524
A ₂	Face to Face RTJ	in.	7.00	8.50	9.00	10.00	12.00	14.50	20.00	25.00	28.00	31.50	34.50	39.00	39.00	51.50	61.00
		mm	178	216	229	254	305	368	508	635	711	800	876	991	991	1308	1550
K	Center to Top	in.	3.88	5.37	6.00	6.50	7.50	9.25	11.25	11.87	13.62	15.87	21.12	22.25	24.75	34.00	39.25
		mm	98	137	152	165	191	235	286	302	346	403	536	565	629	864	997
	Weight Flanged Ends	lbs.	26	39	50	65	104	180	336	519	703	900	1175	1497	2370	4580	5900
		kg	12	18	23	29	47	82	152	235	319	408	533	679	1075	2077	2667
	Weight Weld Ends	lbs.	20	32	43	58	87	150	258	392	550	700	940	1295	2144	4300	5400
		kg	9	15	20	26	39	68	117	178	249	318	426	587	973	1950	2450

Notes:
1. Dimensions, weights and other engineering data are subject to change or modification. This data is not to be used for construction unless confirmed by the factory.

RELATED DATA
See Technical Data section for: Temperature/pressure data: Raised face or ring joint flanges; Butt weld ends: Flow calculations (Cv).
See Actuators & Accessories section for: Bevel gear, spur gear, chain wheel, motor or cylinder actuators; Bypasses, drains or auxiliary piping; Special packing, etc.

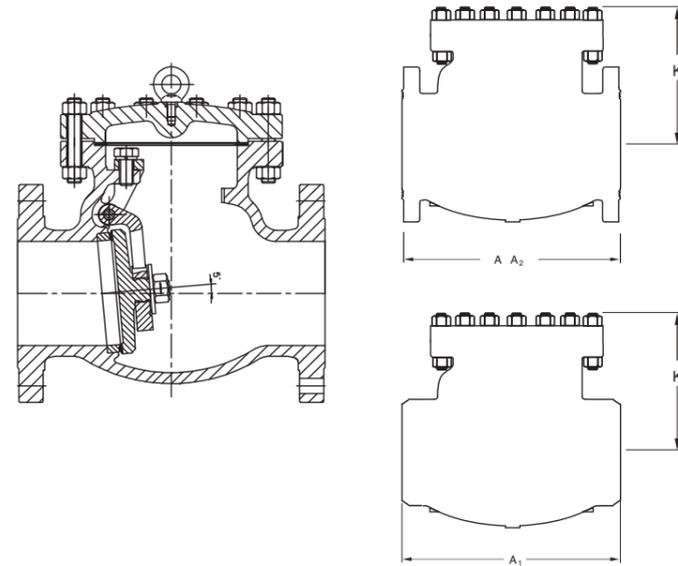
Cast Steel Bolted Bonnet Valves

CCPV

Swing Check Valves • ANSI Class 300

FEATURES

- Full range of body/bonnet materials
- Full range of trim materials
- Anti-rotation disc
- Flanged or butt weld ends
- Full port design – API wall thickness
- Renewable seat rings seal welded
- Horizontal or vertical service
- Male and female bonnet joint
- Double jacketed graphite gasket
- Meet design requirements of ANSI B16.5 and B16.34



DIMENSIONS and WEIGHTS

Dim	Description	VALVE SIZES (inches)															
		1.5	2	2.5	3	4	6	8	10	12	14	16	18	20	24	30	
A	Face to Face Flanged Ends	in.	9.50	10.50	11.50	12.50	14.00	17.50	21.00	24.50	28.00	33.00	34.00	38.50	40.00	53.00	62.75
		mm	241	267	292	318	356	445	533	622	711	838	864	978	1015	1346	1594
A ₁	End to End Weld Ends	in.	9.50	10.50	11.50	12.50	14.00	17.50	21.00	24.50	28.00	33.00	34.00	38.50	40.00	53.00	62.75
		mm	241	267	292	318	356	445	533	622	711	838	864	978	1015	1346	1594
A ₂	Face to Face RTJ	in.	10.00	11.13	12.13	13.13	14.63	18.13	21.63	25.13	28.63	33.63	34.63	39.13	40.75	53.88	63.75
		mm	254	282	308	333	372	460	549	638	727	854	880	994	1035	1368	1619
K	Center to Top	in.	6.38	7.00	7.37	8.00	8.87	11.37	13.25	15.25	18.00	19.25	20.87	22.25	22.87	33.25	39.25
		mm	162	178	187	203	225	289	337	387	457	489	530	565	581	845	997
	Weight Flanged Ends	lbs.	50	65	87	110	160	331	510	784	1280	1490	2032	2446	2980	4840	6600
		kg	23	29	39	50	73	150	231	356	581	676	922	1110	1352	2195	2994
	Weight Weld Ends	lbs.	44	56	74	94	137	297	459	712	1176	1340	1855	2270	2735	4482	5700
		kg	20	25	34	43	62	138	208	323	533	608	841	1030	1241	2033	2586

Notes:
1. Dimensions, weights and other engineering data are subject to change or modification. This data is not to be used for construction unless confirmed by the factory.

RELATED DATA
See Technical Data section for: Temperature/pressure data: Raised face or ring joint flanges; Butt weld ends; Flow calculations (Cv).
See Actuators & Accessories section for: Bevel gear, spur gear, chain wheel, motor or cylinder actuators; Bypasses, drains or auxiliary piping; Special packing, etc.

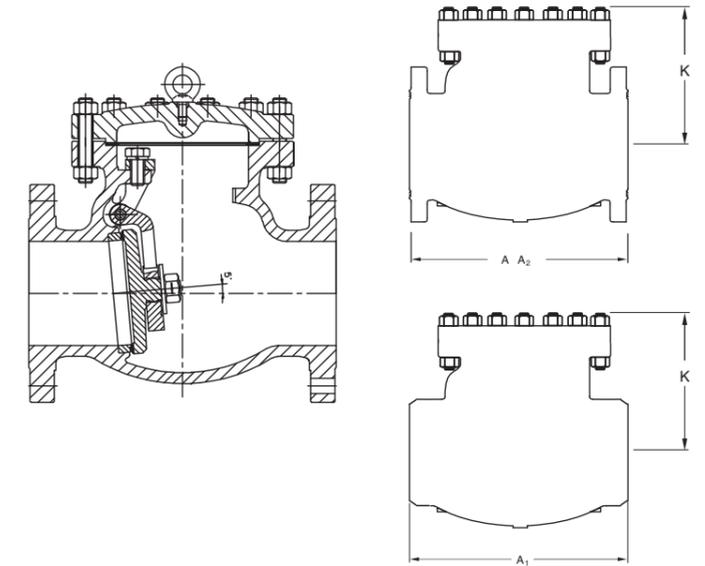
CCPV

Cast Steel Bolted Bonnet Valves

Swing Check Valves • ANSI Class 600

FEATURES

- Full range of body/bonnet materials
- Full range of trim materials
- Anti-rotation disc
- Flanged or butt weld ends
- Full port design – API wall thickness
- Renewable seat rings seal welded
- Horizontal or vertical service
- Ring type joint
- Meet design requirements of ANSI B16.5 and B16.34



DIMENSIONS and WEIGHTS

Dim	Description	VALVE SIZES (inches)												
		1.5	2	2.5	3	4	6	8	10	12	14	16	20	
A	Face to Face Flanged Ends	in.	9.50	11.50	13.00	14.00	17.00	22.00	26.00	31.00	33.00	35.00	39.00	47.00
		mm	241	292	330	356	432	559	660	787	838	889	991	1194
A ₁	End to End Weld Ends	in.	9.50	11.50	13.00	14.00	17.00	22.00	26.00	31.00	33.00	35.00	39.00	47.00
		mm	241	292	330	356	432	559	660	787	838	889	991	1194
A ₂	Face to Face RTJ	in.	9.50	11.62	13.12	14.12	17.12	22.12	26.12	31.12	33.12	35.12	39.12	47.25
		mm	241	295	333	359	435	562	664	791	841	892	994	1200
K	Center to Top	in.	–	7.52	–	9.76	12.13	14.37	16.14	18.31	20.08	22.09	24.33	38.74
		mm	–	191	–	248	308	364	410	465	510	561	618	730
	Weight Flanged Ends	lbs.	80	100	135	152	280	550	910	1435	1892	2640	3480	5260
		kg	36	45	61	69	127	2449	413	651	858	1198	1575	2386
	Weight Weld Ends	lbs.	60	86	120	125	225	486	783	1160	1570	2251	2890	4375
		kg	27	39	54	57	102	220	355	526	712	1021	1310	1985

Note:
1. Dimensions, weights and other engineering data are subject to change or modification. This data is not to be used for construction unless confirmed by the factory.

RELATED DATA
See Technical Data section for: Temperature/pressure data: Raised face or ring joint flanges; Butt weld ends; Flow calculations (Cv).
See Actuators & Accessories section for: Bevel gear, spur gear, chain wheel, motor or cylinder actuators; Bypasses, drains or auxiliary piping; Special packing, etc.