



Serving Your Energy Needs

www.aesflowcontrols.com

**API-600
Products
Brochure**

AES Flow Controls

Gate Valves

Globe Valves

Angle Valves

Swing Check Valves

Tilting Disc Check Valves

Stop Check Valves

Angle Stop Check Valves

is dedicated to

manufacturing and
supplying valves of

the highest quality,

in accordance with
customer specifications,

competitively priced

and delivered on time.



AES FLOW CONTROLS

★ Quality Control

Currently re-applying product monograms API 6A & 6D Q1.

In addition to external and certifying authority audits, we maintain a self-auditing Quality Assurance program which provides us with identifiable goals for continual quality improvement. Dedicated to material traceability, we maintain our own in-house laboratory analysis (PMI), including an ARC-MET 9000 Optical Emission Spectrometer. Integrity of materials provided for AES valves is more than just a certificate. Every AES valve must pass rigid tests throughout the manufacturing process including a final hydrostatic test prior to shipping.

★ Engineering

AES maintains an in-house engineering department to assist with compliance to customer requirements. Complemented by designers, metallurgist and draftsmen, our engineering department stands ready to serve our customer's diverse needs. Whether the specifications are mundane or unique, AES staff brings the experience and resources required to handle your application criteria.

Cast Steel Bolted Bonnet Gate Valves

Sizes: 2" thru 48"

Pressure Class: 150 thru 1500



Serving Your Energy Needs

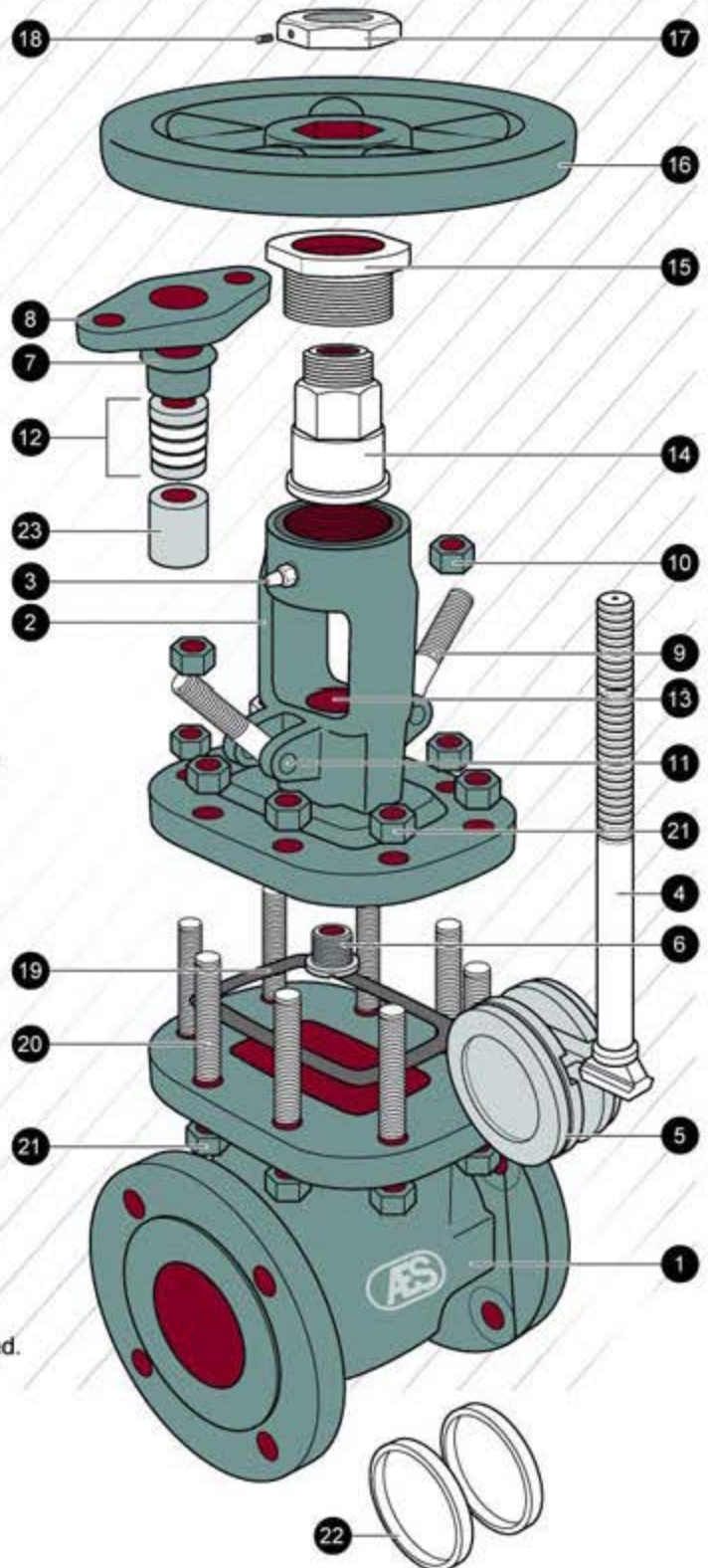




Serving Your Energy Needs

Typical AES Cast Steel Bolted Bonnet Gate Valve Expanded View

1. **Body:** Cast steel bodies provide low flow resistance and optimum strength and performance.
2. **Yoke & Bonnet:** Bonnet assemblies are built to the same standards as the bodies. Larger size gate valves may utilize a multi-piece bonnet design.
3. **Grease Fitting:** The grease fitting allows for easy stem lubrication.
4. **Stem:** The stem is precision machined and inserts into the horizontal channel in the disc.
5. **Wedge:** Wedge is machined to the tightest tolerances to ensure trouble free shutoff and cycling.
6. **Back Seat Bushing:** The back seat, when engaged with the stem head, provides a stable shutoff to the stuffing box which isolates the packing.
7. **Gland:** Compresses a packing to create a stem seal above a back seat, between a bonnet and stem.
8. **Gland Flange:** Applies pressure to the gland for accurate packing adjustments.
9. & 10. **Gland Bolts & Nuts:** The gland bolt and nut allow for easy adjustments for packing compression.
11. **Gland Bolt Pin:** The gland bolt pin secures the gland bolts to the yoke & bonnet.
12. **Packing:** The packing creates a seal above the back seat, between the bonnet and stem.
13. **Stuffing Box:** The stuffing box contains the packing.
14. **Stem Nut:** The stem nut raises or lowers the stem to open or close the valve.
15. **Yoke Bushing:** The retaining nut secures the stem nut to the bonnet assembly.
16. **Handwheel:** The handwheel cycles the valve.
17. **Handwheel Nut:** The handwheel nut secures the handwheel to the bonnet assembly.
18. **Set Screw:** The set screw prevents the handwheel nut from loosening.
19. **Bonnet Gasket:** The bonnet gasket creates a leakproof seal between the bonnet and body.
20. & 21. **Bonnet Studs & Nuts:** The bonnet studs and nuts secure the bonnet to the body.
22. **Seat Rings:** The seat rings can be either threaded or welded into the body of the valve. After installation, they are then precision ground for optimal seating with the wedge.
23. **Spacer Ring:** Assists the packing rings in creating a seal above the back seat, between the bonnet and stem, when provided.

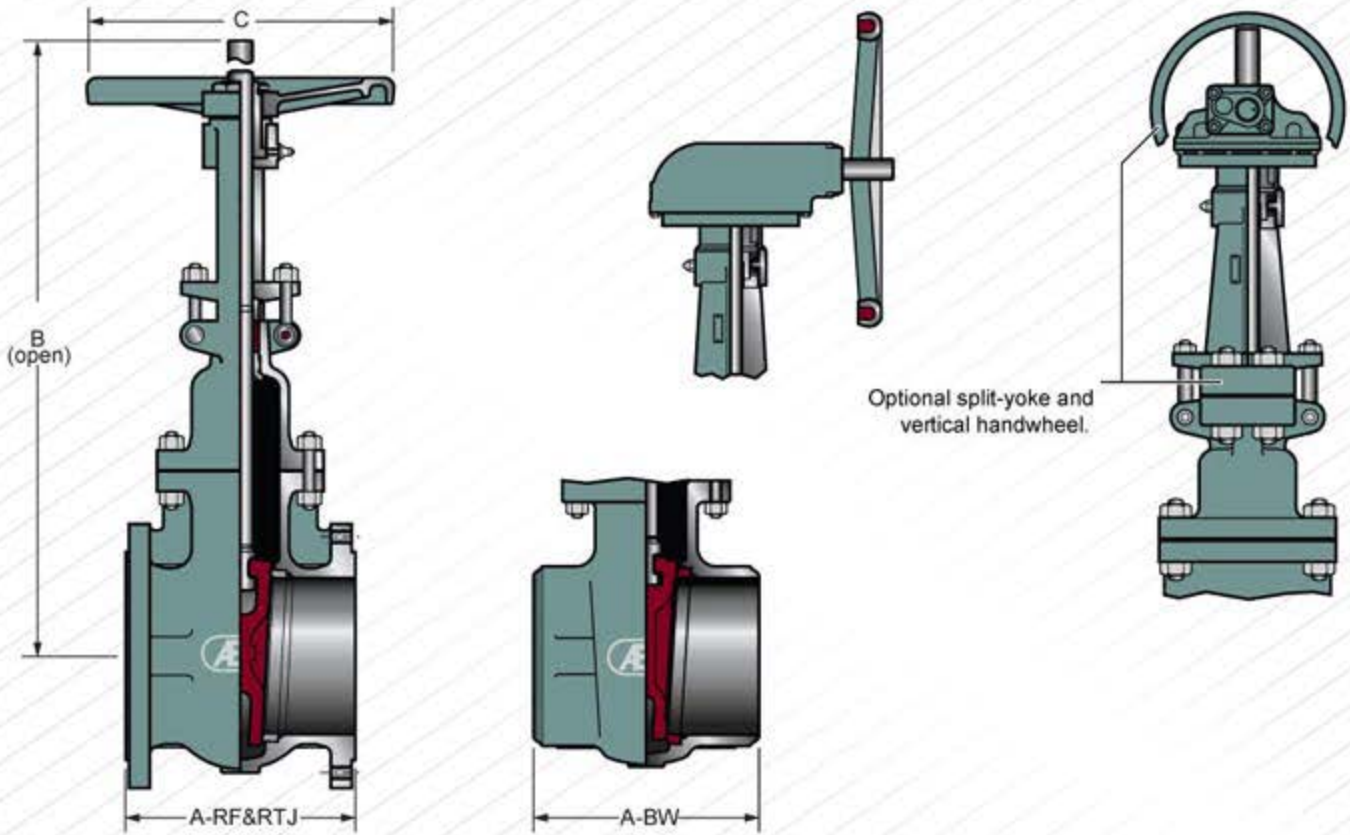


AES Cast Carbon Steel Bolted Bonnet Valves
Product Line Technical Data

Cast Steel Bolted Bonnet Gates
Class 150 - Sizes: 2" thru 48"

Design and Manufacturing Standards

Valve Design: ASME B16.34/API 600
Flange Dimensions: ASME B16.5, B16.47
Face-to-Face Dimensions: ASME B16.10
Tested in Accordance with: API 598
Recommended Spare Parts*



** = Gear operated is standard. Handwheel available upon request.

Typical Bill of Materials

Component	A11	A18	A22	Component	A11	A18	A22
Body	ASTM A216-WCB			Gland Flange	ASTM A216-WCB		
Seat Rings	ASTM A105/HF			Gland Bolt Pins	ASTM A36		
Wedge 2" - 3"	ASTM A276-410	ASTM A216-WCB/HF	ASTM A351-CF8M/A276-316	Gland Bolts	ASTM A307-B		
Wedge 4" & larger	ASTM A216-WCB w/13% Chrome		CS-316	Gland Nuts	ASTM A194-2H		
Stem	ASTM A276-410T		ASTM A276-410T	Nameplate	Stainless Steel 304		
Yoke & Bonnet	ASTM A216-WCB			Nameplate Rivets	Stainless Steel - Commercial		
*Bonnet Gasket	Multilayered Corrugated 316 w/Graphite			Grease Fitting	Carbon Steel - Commercial		
Bonnet Nuts	ASTM A194-2H			Stem Nut	ASTM A439-D2		
Bonnet Studs	ASTM A193-B7			Yoke Bushing	ASTM A536 (65-45-12)		
Back Seat Bushing	ASTM A276-410	ASTM A276-316		Handwheel	ASTM A536 (65-45-12)		
*Packing	Graphite w/Braided Carbon Fiber End Rings			Handwheel Nut	ASTM A536 (65-45-12)		
Gland	ASTM A276-410	ASTM A276-316		Set Screw	ASTM A193-B6		
				Spacer Ring	N/A		

Class 150

Size	nps	2	2.5	3	4	5	6	8	10	12	14	16	18	20	24	30	36	42	48
	dn	50	65	80	100	125	150	200	250	300	350	400	450	500	600	750	900	1050	1200
A-RF	in	7.0	7.5	8.0	9.0	10.0	10.5	11.5	13.0	14.0	15.0	16.0	17.0	18.0	20.0	24.0	28.0	31.0	34.0
	mm	178	191	203	229	254	267	292	330	356	381	406	432	457	508	610	711	813	864
A-BW	in	8.5	9.5	11.1	12.0	15.0	15.9	16.5	18.0	19.8	22.5	24.0	26.0	28.0	32.0	24.0	28.0	43.0	46.0
	mm	216	241	282	305	381	404	419	457	503	572	610	660	711	813	610	711	1092	1168
B	in	14.8	17.1	18.2	22.6	28.1	33.2	38.9	46.4	54.6	63.5	72.4	79.2	86.0	100.8	125.1	153.2	174.4	217.5
	mm	376	434	462	574	714	843	988	1179	1387	1613	1839	2012	2184	2560	3178	3891	4430	5525
C	in	8.0	8.0	8.0	10.0	13.8	14.0	16.0	18.0	20.0	22.0	24.0	27.0	30.0	30.0	35.0	43.0	35.4	35.4
	mm	203	203	203	254	350	356	406	457	508	559	610	686	762	762	889	1092	**900	**900
RF	lbs	46	56	71	111	163	196	289	449	639	860	1190	1389	1786	2602	4466	4850	10134	15677
Wt.	kg	21	25	32	50	74	89	131	204	290	391	541	631	812	1183	2030	1193	4600	8500
BW	lbs	40	46	58	91	152	180	259	425	584	811	1146	1349	1720	2534	4037	4385	10198	15545
	kg	18	21	26	41	69	82	118	193	265	369	521	613	782	1152	1835	1993	4625	8550

Note: Dimensions: Inches/Millimeters - Weights: Pounds/Kilograms. Larger sizes available on request. Dimensions are subject to change without notice.

AES Cast Carbon Steel Bolted Bonnet Valves

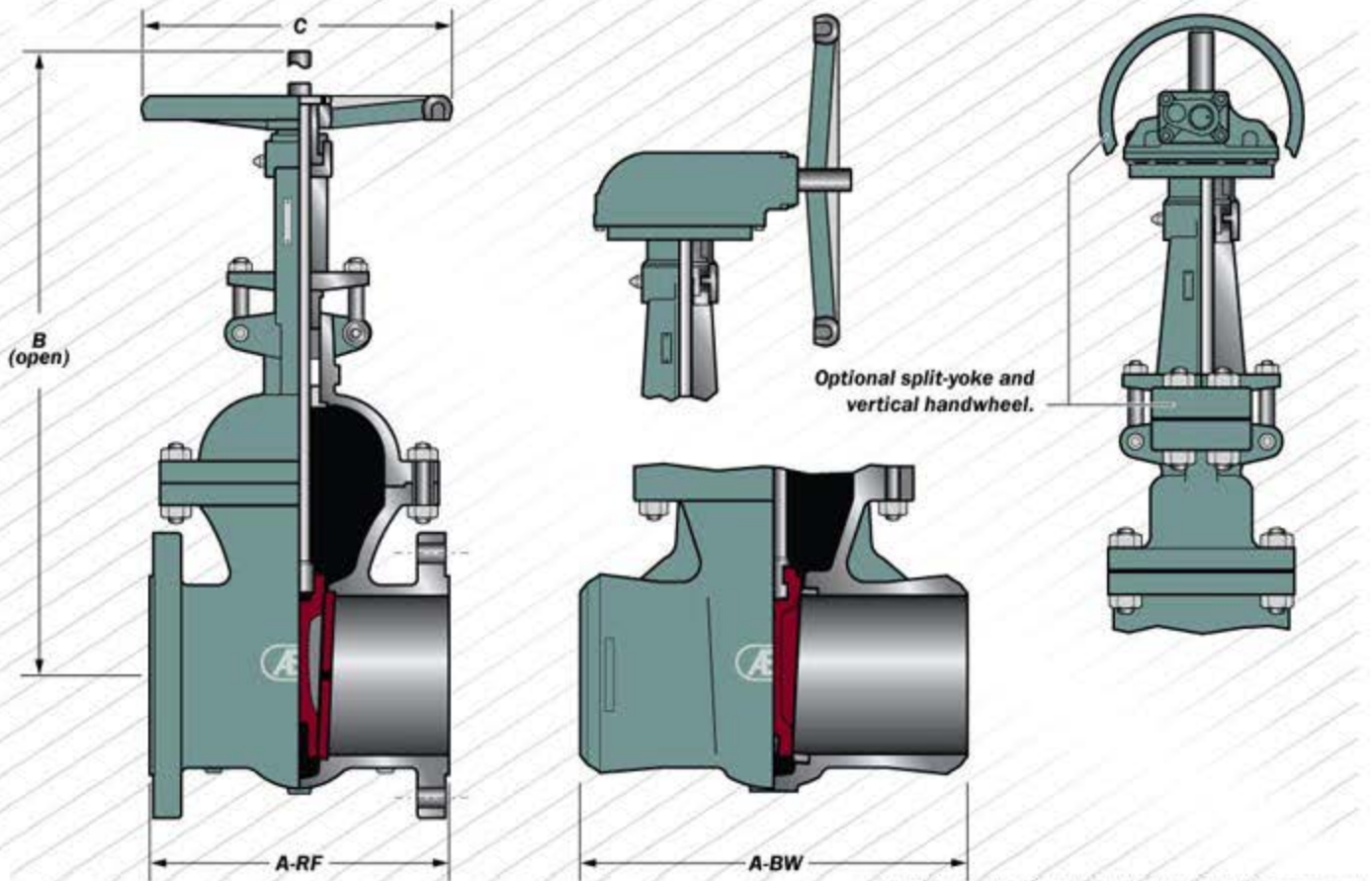
Product Line Technical Data

Cast Steel Bolted Bonnet Gates

Class 300 - Sizes: 2" thru 36"

Design and Manufacturing Standards

Valve Design: ASME B16.34/API 600
Flange Dimensions: ASME B16.5, B16.47
Face-to-Face Dimensions: ASME B16.10
Tested in Accordance with: API 598
Recommended Spare Parts*



** = Gear operated is standard. Handwheel available upon request.

Typical Bill of Materials

Component	A11	A18	A22	Component	A11	A18	A22
Body	ASTM A216-WCB			Gland Flange	ASTM A216-WCB		
Seat Rings	ASTM A105/HF			Gland Bolt Pins	ASTM A36		
Wedge 2" - 3"	ASTM A276-410	ASTM A216-WCB/HF	ASTM A351-CF8M/A276-316	Gland Bolts	ASTM A307-B		
Wedge 4" & larger	ASTM A216-WCB w/13% Chrome	ASTM A216-WCB/HF	CS-316	Gland Nuts	ASTM A194-2H		
Stem	ASTM A276-410T		ASTM A276-410T	Nameplate	Stainless Steel 304		
Yoke & Bonnet	ASTM A216-WCB			Nameplate Rivets	Stainless Steel - Commercial		
*Bonnet Gasket	Spiral Wound 316 Stainless Steel/Graphite			Grease Fitting	Carbon Steel - Commercial		
Bonnet Nuts	ASTM A194-2H			Stem Nut	ASTM A439-D2		
Bonnet Studs	ASTM A193-B7			Yoke Bushing	ASTM A536 (65-45-12)		
Back Seat Bushing	ASTM A276-410	ASTM A276-316		Handwheel	ASTM A536 (65-45-12)		
*Packing	Graphite w/Braided Carbon Fiber End Rings			Handwheel Nut	ASTM A536 (65-45-12)		
Gland	ASTM A276-410		ASTM A276-316	Set Screw	ASTM A193-B6		
				Spacer Ring	ASTM A276-410		

Class 300

Size	nps	2	2.5	3	4	5	6	8	10	12	14	16	18	20	24	30	36
A-RF	dn	50	65	80	100	125	150	200	250	300	350	400	450	500	600	750	900
	in	8.5	9.5	11.1	12.0	15.0	15.9	16.5	18.0	19.75	30.0	33.0	36.0	39.0	45.0	55.0	68.0
A-BW	mm	216	241	282	305	381	404	419	457	502	762	838	914	991	1143	1397	1727
	in	8.5	9.5	11.1	12.0	15.0	15.9	16.5	18.0	19.75	30.0	33.0	36.0	39.0	45.0	55.0	68.0
B	mm	17.2	19.1	20.0	24.0	29.6	33.0	41.1	49.3	57.0	67.0	73.1	82.2	95.5	104.7	136.3	169.8
	in	437	485	508	610	752	838	1044	1252	1448	1702	1857	2088	2426	2659	3462	4312
C	in	8.0	10.0	10.0	12.0	13.7	16.0	18.0	20.0	22.0	25.2	27.0	27.0	30.0	30.0	31.9	31.9
	mm	203	254	254	305	350	406	457	508	559	640	686	686	762	762	**810	**810
RF	lbs	64	88	112	175	258	340	542	816	1072	1764	2183	2867	3682	5645	9702	15104
Wt.	kg	29	40	51	80	117	155	246	371	487	802	992	1303	1674	2566	4410	6850
BW	lbs	51	68	86	154	207	269	430	620	871	1323	1830	2381	3109	4873	8350	11003
Wt.	kg	23	31	39	70	94	122	195	282	396	601	832	1082	1413	2215	3795	4990

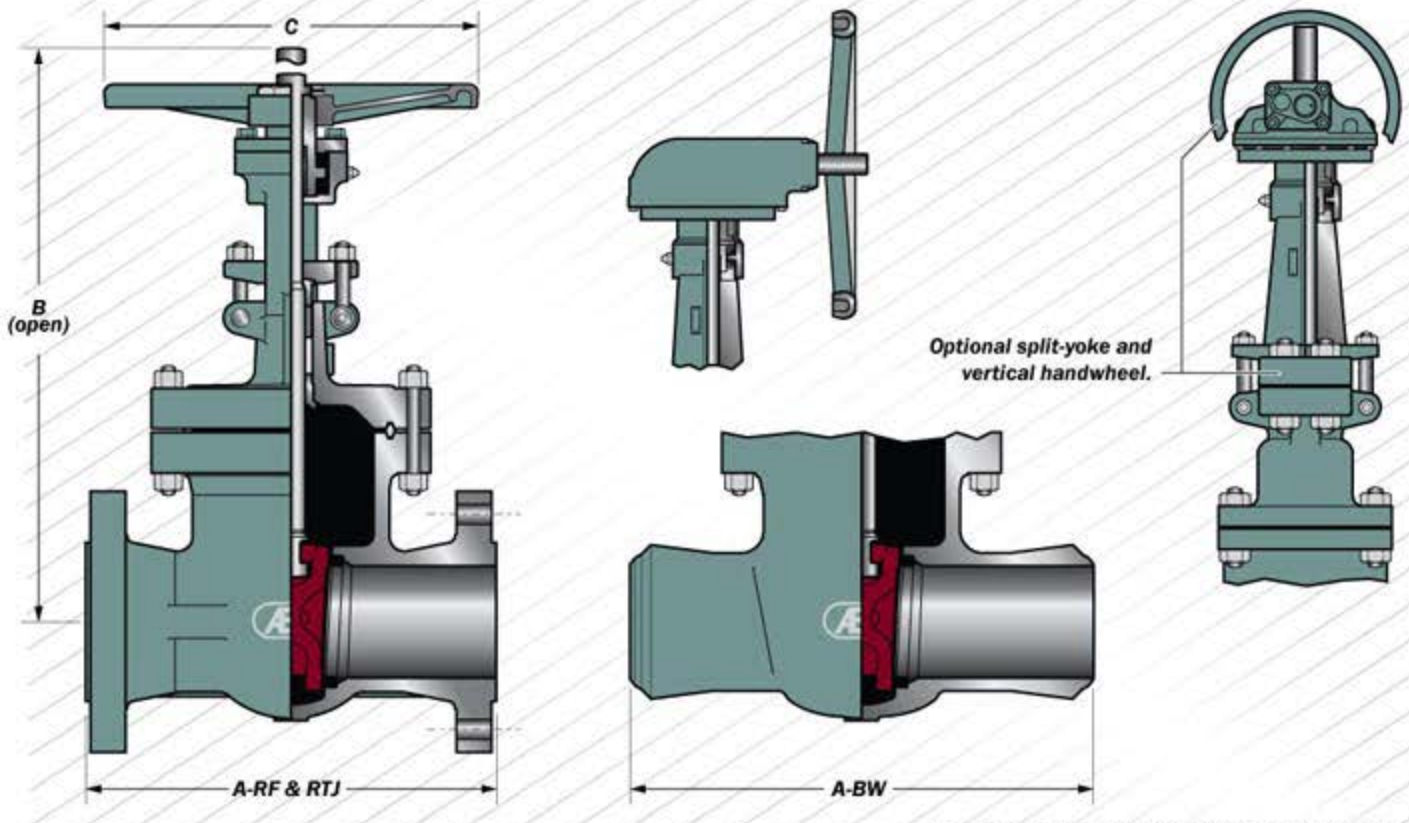
Note: Dimensions: Inches/Millimeters - Weights: Pounds/Kilograms. Larger sizes available on request. Dimensions are subject to change without notice.

AES Cast Carbon Steel Bolted Bonnet Valves
Product Line Technical Data

Cast Steel Bolted Bonnet Gates
Class: 600 - Sizes: 2" thru 24"

Design and Manufacturing Standards

Valve Design: ASME B16.34/API 600
Flange Dimensions: ASME B16.5, B16.47
Face-to-Face Dimensions: ASME B16.10
Tested in Accordance with: API 598
Recommended Spare Parts*



** = Gear operated is standard. Handwheel available upon request.

Typical Bill of Materials

Component	A11	A18	A22	Component	A11	A18	A22
Body	ASTM A216-WCB			Gland Flange	ASTM A216-WCB		
Seat Rings	ASTM A105/HF			Gland Bolt Pins	ASTM A36		
Wedge 2" - 3"	ASTM A276-410	ASTM A216-WCB/HF	ASTM A351-CF8M/A276-316	Gland Bolts	ASTM A307-B		
Wedge 4" & larger	ASTM A216-WCB w/13% Chrome	ASTM A216-WCB/HF	CS-316	Gland Nuts	ASTM A194-2H		
Stem	ASTM A182-F6a		ASTM A182-316	Nameplate	Stainless Steel 304		
Yoke & Bonnet	ASTM A216-WCB			Nameplate Rivets	Stainless Steel - Commercial		
*Bonnet Gasket	Soft Steel Ring Joint			Grease Fitting	Carbon Steel - Commercial		
Bonnet Nuts	ASTM A194-2H			Stem Nut	ASTM A439-D2		
Bonnet Studs	ASTM A193-B7			Yoke Bushing	ASTM A536 (65-45-12)		
Back Seat Bushing	ASTM A276-410	ASTM A276-316		Handwheel	ASTM A536 (65-45-12)		
*Packing	Graphite w/Braided Carbon Fiber End Rings			Handwheel Nut	ASTM A536 (65-45-12)		
Gland	ASTM A276-410	ASTM A276-316		Set Screw	ASTM A193-B6		
				Spacer Ring	ASTM A276-410		

Class 600

Size	nps	2	2.5	3	4	5	6	8	10	12	14	16	18	20	24
A-RF	in	11.5	13.0	14.0	17.0	20.0	22.0	26.0	31.0	33.0	35.0	39.0	43.0	47.0	55.0
	mm	292	330	356	432	508	559	660	787	838	889	991	1092	1194	1397
A-BW	in	11.5	13.0	14.0	17.0	20.0	22.0	26.0	31.0	33.0	35.0	39.0	43.0	47.0	55.0
	mm	292	330	356	432	508	559	660	787	838	889	991	1092	1194	1397
A-RTJ	in	11.62	13.12	14.12	17.12		22.12	26.12	31.12	33.12	35.12	39.12	43.12	47.25	55.38
	mm	295	333	359	435		562	664	791	841	892	994	1095	1200	1406
B	in	18.3	19.9	21.7	26.9	31.6	36.5	44.0	52.8	61.4	64.8	71.7	79.3	104.8	116.9
	mm	465	505	551	683	803	927	1118	1341	1560	1646	1821	2014	2662	2970
C	in	10.0	10.0	12.0	15.0	18.0	20.0	24.0	27.0	27.0	30.0	35.0	43.0	43.0	31.9
	mm	254	254	305	381	457	508	610	686	686	762	889	1092	1092	**810
RF-RTJ	lbs	97	132	176	320	520	680	1150	1715	2440	3150	4415	5010	6853	10337
Wt.	kg	44	60	80	145	236	309	523	780	1109	1432	2007	2277	3108	4688
BW	lbs	79	120	152	270	430	580	1020	1430	1950	2695	3800	5010	5640	8595
	kg	36	55	69	123	195	264	464	650	886	1225	1727	2277	2558	3898

Note: Dimensions: Inches/Millimeters - Weights: Pounds/Kilograms. Larger sizes available on request. Dimensions are subject to change without notice.

AES Cast Carbon Steel Bolted Bonnet Valves

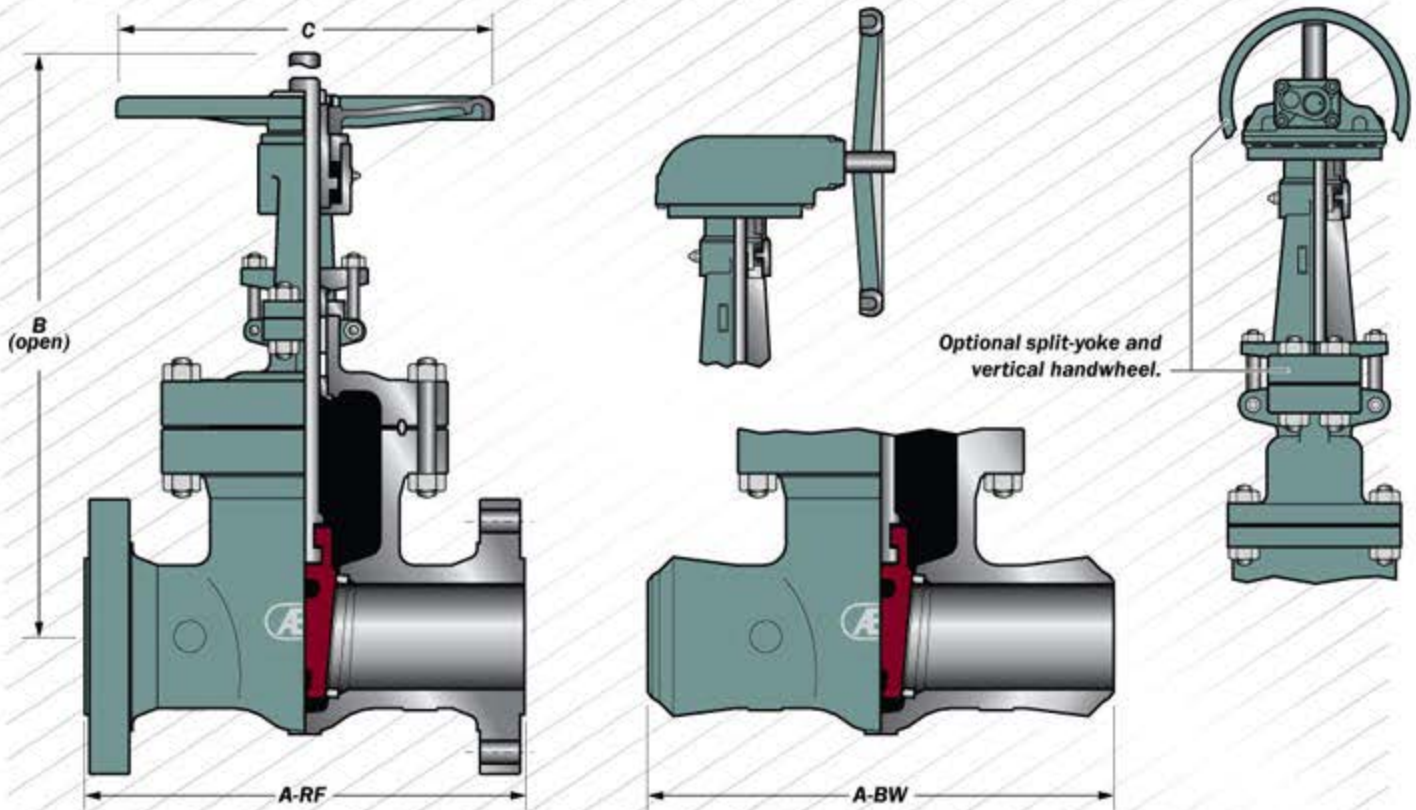
Product Line Technical Data

Cast Steel Bolted Bonnet Gates

Class: 900 - Sizes: 2" thru 12"

Design and Manufacturing Standards

Valve Design: ASME B16.34/API 600
Flange Dimensions: ASME B16.5, B16.47
Face-to-Face Dimensions: ASME B16.10
Tested in Accordance with: API 598
Recommended Spare Parts*



Typical Bill of Materials

Component	A11	A18	A22	Component	A11	A18	A22
Body	ASTM A216-WCB			Gland Flange	ASTM A216-WCB		
Seat Rings	ASTM A105/HF			Gland Bolt Pins	ASTM A36		
Wedge 2" - 3"	ASTM A276-410	ASTM A216-WCB/HF	ASTM A351-CF8M/A276-316	Gland Bolts	ASTM A307-B		
Wedge 4" & larger	ASTM A216-WCB w/13% Chrome	ASTM A216-WCB/HF	CS-316	Gland Nuts	ASTM A194-2H		
Stem	ASTM A182-F6a		ASTM A182-316	Nameplate	Stainless Steel 304		
Yoke & Bonnet	ASTM A216-WCB			Nameplate Rivets	Stainless Steel - Commercial		
*Bonnet Gasket	Soft Steel Ring Joint			Grease Fitting	Carbon Steel - Commercial		
Bonnet Nuts	ASTM A194-2H			Stem Nut	ASTM A439-D2		
Bonnet Studs	ASTM A193-B7			Yoke Bushing	ASTM A536 (65-45-12)		
Back Seat Bushing	ASTM A276-410	ASTM A276-316		Handwheel	ASTM A536 (65-45-12)		
*Packing	Graphite w/Braided Carbon Fiber End Rings			Handwheel Nut	ASTM A536 (65-45-12)		
Gland	ASTM A276-410	ASTM A276-316		Set Screw	ASTM A193-B6		
				Spacer Ring	ASTM A276-410		

Class 900

Size	nps	2	2.5	3	4	6	8	10	12
A-RF	dn	50	65	75	100	150	200	250	300
	in	14.5	16.5	15.0	18.0	24.0	29.0	33.0	38.0
A-BW	mm	368	419	381	457	610	737	838	965
	in	14.5	16.5	15.0	18.0	24.0	29.0	33.0	38.0
A-RTJ	mm	368	419	381	457	610	737	838	965
	in	14.62	16.62	15.12	18.12	24.12	29.12	33.12	38.12
B	mm	371	422	384	460	612	740	841	968
	in	21.7	26.0	23.7	27.6	38.4	45.5	52.6	59.8
C	mm	551	660	602	701	975	1156	1336	1519
	in	9.8	9.8	13.8	13.8	22.0	25.2	30.0	30.0
RF	mm	250	250	350	350	560	640	760	760
	lbs	135	175	255	453	913	1705	2387	3600
Wt.	kg	61	385	116	206	415	775	1085	1636
	lbs	125	155	213	396	807	1465	1724	2790
Wt.	kg	57	70	97	180	367	665	784	1268

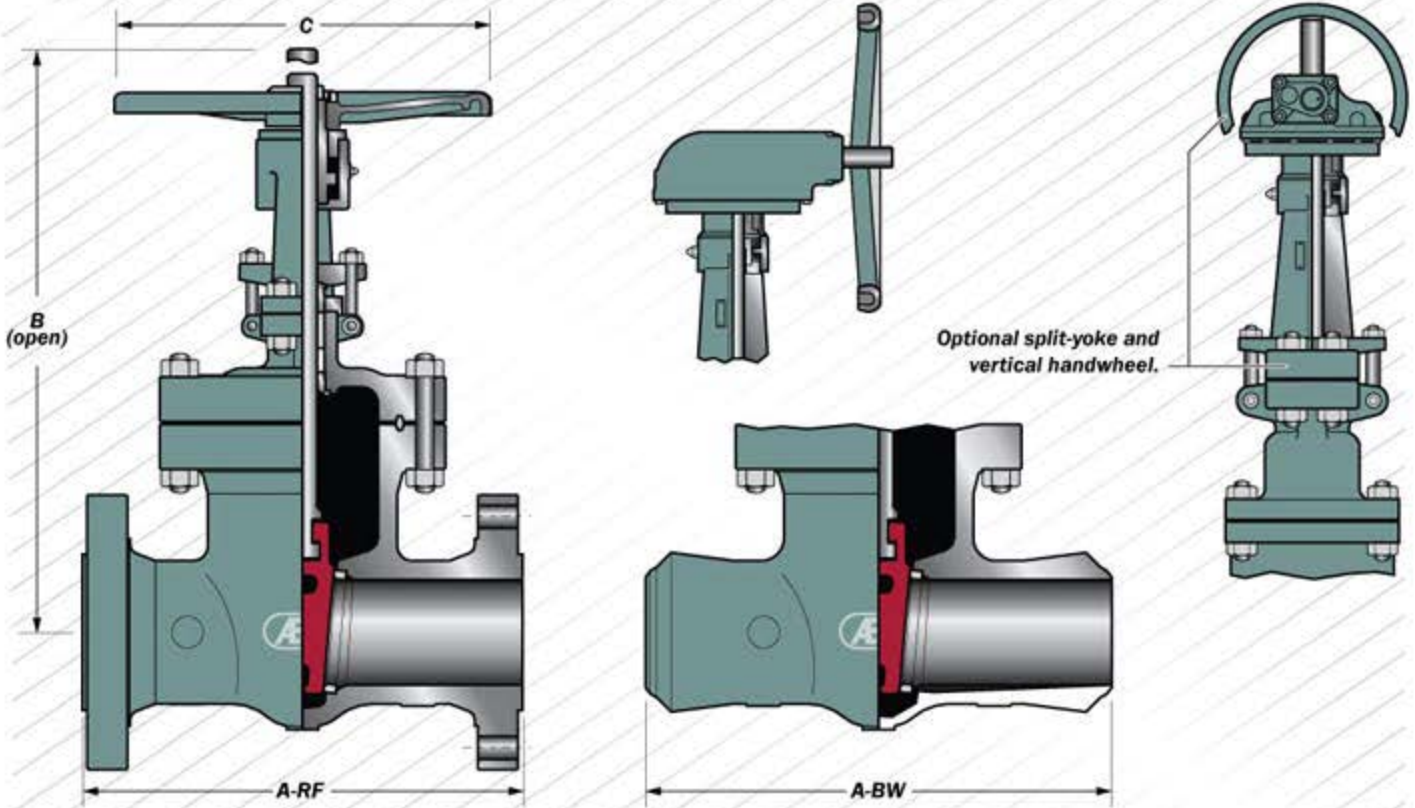
Note: Dimensions: Inches/Millimeters - Weights: Pounds/Kilograms. Larger sizes available on request. Dimensions are subject to change without notice.

AES Cast Carbon Steel Bolted Bonnet Valves
Product Line Technical Data

Cast Steel Bolted Bonnet Gates
Class: 1500 - Sizes: 2" thru 12"

Design and Manufacturing Standards

Valve Design: ASME B16.34/API 600
Flange Dimensions: ASME B16.5, B16.47
Face-to-Face Dimensions: ASME B16.10
Tested in Accordance with: API 598
Recommended Spare Parts*



Typical Bill of Materials

Component	A11	A18	A22	Component	A11	A18	A22
Body	ASTM A216-WCB			Gland Flange	ASTM A216-WCB		
Seat Rings	ASTM A105/HF			Gland Bolt Pins	ASTM A36		
Wedge 2" - 3"	ASTM A276-410	ASTM A216-WCB/HF	ASTM A351-CF8M/A276-316	Gland Bolts	ASTM A307-B		
Wedge 4" & larger	ASTM A216-WCB w/13% Chrome	ASTM A216-WCB/HF	CS-316	Gland Nuts	ASTM A194-2H		
Stem	ASTM A182-F6a		ASTM A182-316	Nameplate	Stainless Steel 304		
Yoke & Bonnet	ASTM A216-WCB			Nameplate Rivets	Stainless Steel - Commercial		
*Bonnet Gasket	Soft Steel Ring Joint			Grease Fitting	Carbon Steel - Commercial		
Bonnet Nuts	ASTM A194-2H			Stem Nut	ASTM A439-D2		
Bonnet Studs	ASTM A193-B7			Yoke Bushing	ASTM A536 (65-45-12)		
Back Seat Bushing	ASTM A276-410	ASTM A276-316		Handwheel	ASTM A536 (65-45-12)		
*Packing	Graphite w/Braided Carbon Fiber End Rings			Handwheel Nut	ASTM A536 (65-45-12)		
Gland	ASTM A276-410	ASTM A276-316		Set Screw	ASTM A193-B6		
				Spacer Ring	ASTM A276-410		

Class 1500

Size	nps	2	2.5	3	4	6	8	10	12
A-RF	dn	50	65	75	100	150	200	250	300
	in	14.5	16.5	18.5	21.5	27.8	32.75	39.0	44.5
A-BW	mm	368	419	470	546	706	832	991	1130
	in	14.5	16.5	18.5	21.5	27.8	32.75	39.0	44.5
A-RTJ	mm	371	422	473	549	711	841	1000	1146
	in	14.62	16.62	18.62	21.62	28.0	33.13	39.38	45.12
B	mm	551	660	724	828	998	1223	1688	2090
	in	21.7	26.0	28.5	32.6	39.3	48.1	66.5	82.3
C	mm	300	300	400	500	600	760	760	889
	in	11.8	11.8	15.75	19.6	23.6	30.0	30.0	35.0
RF Wt.	lbs	128	163	209	423	978	1625	4412	8414
	kg	58	74	95	192	445	739	2001	3816
BW Wt.	lbs	106	137	174	352	870	1650	3541	7080
	kg	48	62	79	160	395	750	1606	3211

Note: Dimensions: Inches/Millimeters - Weights: Pounds/Kilograms. Larger sizes available on request. Dimensions are subject to change without notice.

THIS PAGE HAS BEEN INTENTIONALLY BEEN LEFT BLANK

Cast Steel Bolted Bonnet Globe Valves

Sizes: 2" thru 14"

Pressure Class: 150 thru 1500



Serving Your Energy Needs

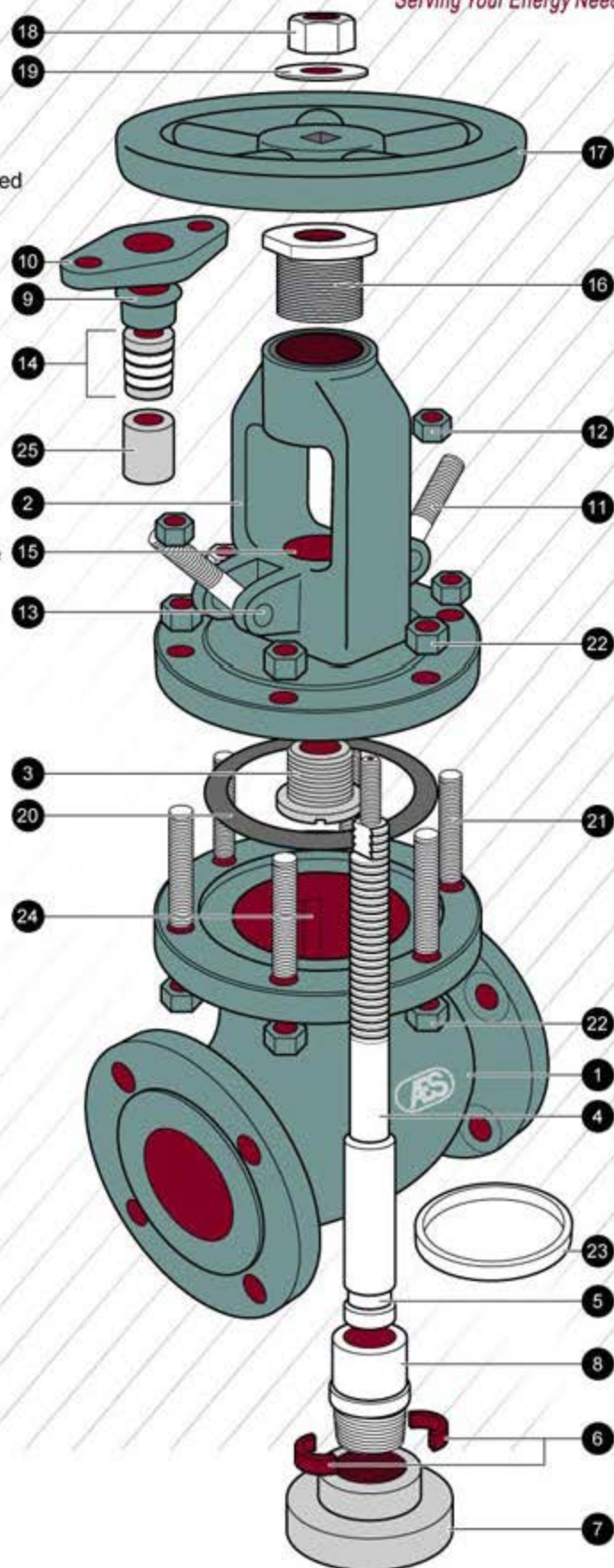




Serving Your Energy Needs

Typical AES Cast Steel Bolted Bonnet Globe Valve Expanded View

- 1. Body:** AES cast steel bodies provide low resistance flow and optimum strength and performance.
- 2. Bonnet:** AES bonnet assemblies are built to the same standards as the bodies.
- 3. Back Seat Bushing:** The back seat bushing, when engaged with the stem head, provides a stable shutoff to the stuffing box which isolates the packing from flow exposure.
- 4. Stem:** The stem inserts vertically into the disc.
- 5. Lock Groove:** The lock groove receives the split lock ring which allows the disc nut to lift the disc during cycling.
- 6. Split Ring:** The split ring allows the disc nut to lift the disc during cycling.
- 7. Disc:** AES plug type disc is machined to the tightest tolerances to ensure trouble free shutoff and cycling.
- 8. Disc Nut:** The disc nut, in conjunction with the split lock ring, secures the disc to the stem.
- 9. Gland:** Compresses the packing to create a stem seal above the back seat, between the bonnet and stem.
- 10. Gland Flange:** Applies pressure to the gland for accurate packing compression.
- 11. & 12. Gland Bolts & Nuts:** The gland bolt and nut allows for easy adjustments for packing compression.
- 13. Gland Bolt Pin:** The gland bolt pin secures the gland bolts to the yoke & bonnet.
- 14. Packing:** The packing creates a seal above the back seat, between the bonnet and stem.
- 15. Stuffing Box:** The stuffing box contains the packing.
- 16. Stem Nut:** The stem nut provides a precision guide for proper stem alignment.
- 17. Handwheel:** The handwheel cycles the valve.
- 18. Handwheel Nut:** The handwheel nut secures the handwheel to the bonnet assembly.
- 19. Handwheel Washer:** The washer helps to prevent loosening or distributes pressure evenly.
- 20. Bonnet Gasket:** The bonnet gasket creates a leakproof seal between the bonnet and body.
- 21. & 22. Bonnet Studs & Nuts:** The bonnet studs and nuts secure the bonnet to the body.
- 23. Seat Ring:** To ensure a stable shutoff, the seat rings is aligned and seal-welded into the valve, then precision ground for optimal seating.
- 24. Disc Guide:** The disc guides provide a stable track for keeping the disc aligned with the seat during cycling.
- 25. Spacer Ring:** Assists the packing rings in creating a seal above the back seat, between the bonnet and stem.

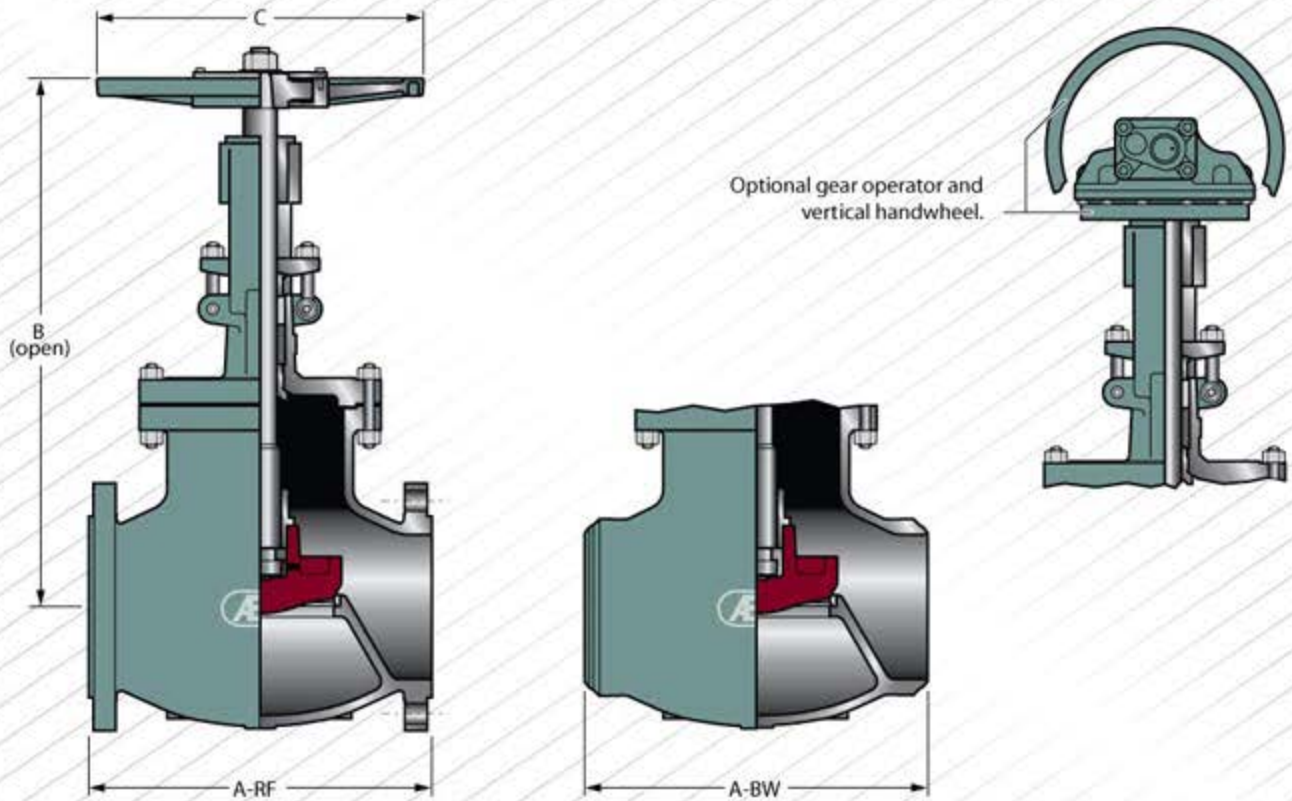


AES Cast Carbon Steel Bolted Bonnet Valves
Product Line Technical Data

Cast Steel Bolted Bonnet Globes
Class: 150 - Sizes: 2" thru 14"

Design and Manufacturing Standards

Valve Design: ASME B16.34/API 600
Flange Dimensions: ASME B16.5, B16.47
Face-to-Face Dimensions: ASME B16.10
Tested in Accordance with: API 598
Recommended Spare Parts*



Typical Bill of Materials

Component	A11	A18	A22	Component	A11	A18	A22
Body	ASTM A216-WCB			Gland Bolt Pins	ASTM A36		
Disc 2" thru 4"	ASTM A276-410	ASTM A216-WCB/ HF	ASTM A276-316	Gland Nuts	ASTM A194-2H		
Disc 5" and larger	ASTM A216-WCB/ 13% Chrome		ASTM A216- WCB/316	Gland Bolts	ASTM A307-B		
Stem	ASTM A276-410		ASTM A276-316	Seat Ring	ASTM A105/HF **		
Bonnet	ASTM A216-WCB			Split Ring	ASTM A276-410		
*Bonnet Gasket	Spiral Wound 316 Stainless Steel/Graphite			Nameplate	ASTM A666-304		
Bonnet Nuts	ASTM A194-2H			Nameplate Rivets	Commercial		
Bonnet Studs	ASTM 193-B7			Disc Nut	ASTM A276-410	ASTM A276-316	
Back Seat Bushing	ASTM A276-410	ASTM A276-316		Stem Nut	ASTM A439-D2		
*Packing	Graphite w/Braided Carbon Fiber End Ring			Handwheel Washer	ASTM A36		
Gland	ASTM A276-410	ASTM A276-316		Handwheel Nut	ASTM A36		
Gland Flange	ASTM A276-WCB			Handwheel	ASTM A536 (65-45-12)		
				Spacer Ring	N/A		

Class 150

Size	nps	2	2.5	3	4	5	6	8	10	12	14
	dn	50	65	75	100	125	150	200	250	300	350
A-RF	in	8.0	8.5	9.5	11.5	14.0	16.0	19.5	24.5	27.5	31.0
	mm	203	216	241	292	356	406	495	622	699	787
A-BW	in	8.0	8.5	9.5	11.5	14.0	16.0	19.5	24.5	27.5	31.0
	mm	203	216	241	292	356	406	495	622	699	787
B	in	14.9	15.8	16.6	19.9	21.8	22.4	26.5	30.6	34.8	41.4
	mm	378	401	422	505	554	569	673	777	884	1052
C	in	8.0	10.0	10.0	12.0	14.0	16.0	18.0	22.0	24.0	25.2
	mm	203	254	254	305	356	406	457	559	610	640
RF	lbs	51	73	93	137	192	243	419	507	948	1276
WL	kg	23	33	42	62	87	110	190	276	476	625
BW	lbs	51	73	93	137	192	243	419	507	948	1276
WL	kg	23	33	42	62	87	110	190	276	476	625

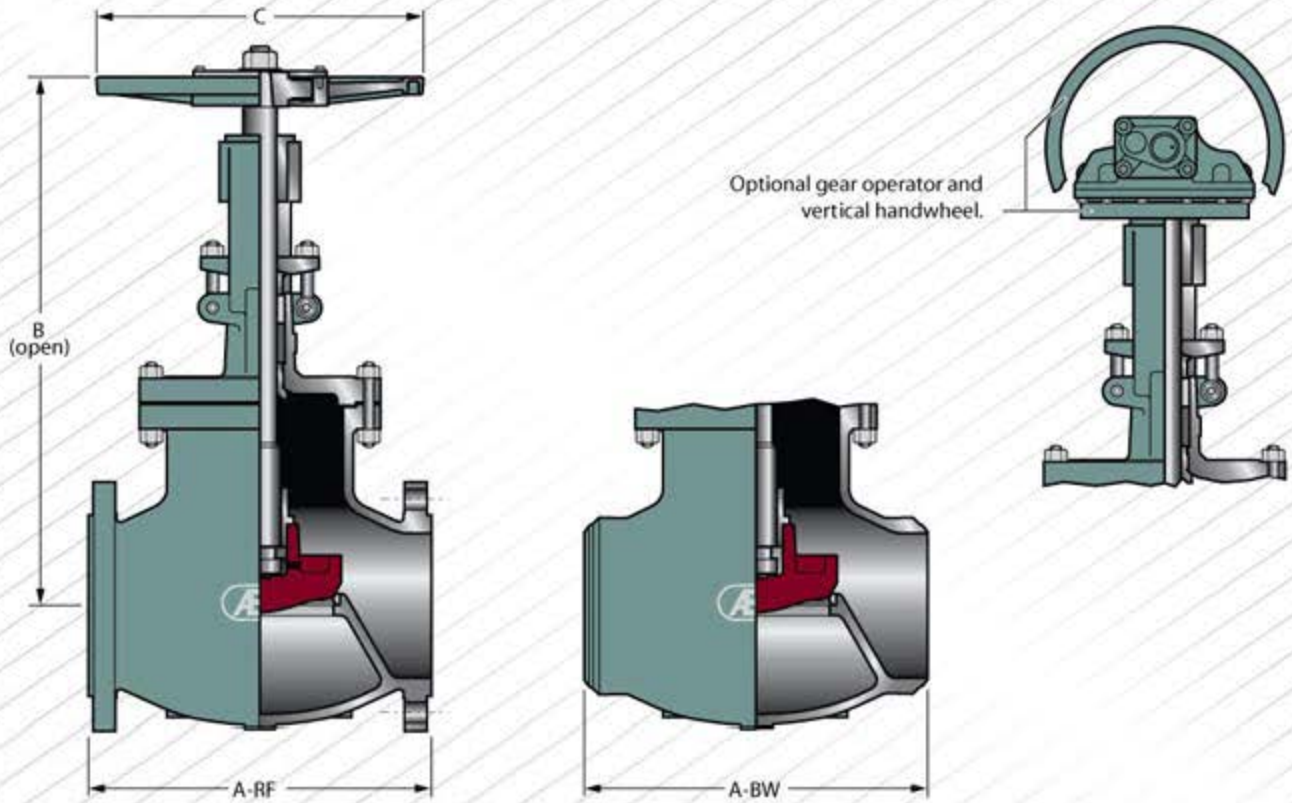
Note: Dimensions: Inches/Millimeters - Weights: Pounds/Kilograms. Larger sizes available on request. Dimensions are subject to change without notice.
** Integral seat w/HF for sizes 2" to 4"

AES Cast Carbon Steel Bolted Bonnet Valves
Product Line Technical Data

Cast Steel Bolted Bonnet Globes
Class: 300 - Sizes: 2" thru 14"

Design and Manufacturing Standards

Valve Design: ASME B16.34/API 600
Flange Dimensions: ASME B16.5, B16.47
Face-to-Face Dimensions: ASME B16.10
Tested in Accordance with: API 598 & API RP591
Recommended Spare Parts**



Typical Bill of Materials

Component	A11	A18	A22	Component	A11	A18	A22
Body	ASTM A216-WCB			Gland Bolt Pins	ASTM A36		
Disc 2" thru 4"	ASTM A276-410	ASTM A216-WCB/ HF	ASTM A276-316	Gland Nuts	ASTM A194-2H		
Disc 5" and larger	ASTM A216-WCB/ 13% Chrome		ASTM A216- WCB/316	Gland Bolts	ASTM A307-B		
Stem	ASTM A276-410		ASTM A276-316	Seat Ring	ASTM A105/HF**		
Bonnet	ASTM A216-WCB			Split Ring	ASTM A276-410		
*Bonnet Gasket	Spiral Wound 316 Stainless Steel/Graphite			Nameplate Rivets	Commercial		
Bonnet Nuts	ASTM A194-2H			Disc Nut	ASTM A276-410	ASTM A276-316	
Bonnet Studs	ASTM 193-B7			Stem Nut	ASTM A439-D2		
Back Seat Bushing	ASTM A276-410	ASTM A276-316		Handwheel Washer	ASTM A36		
*Packing	Graphite W/Braided Carbon Fiber End Rings			Handwheel Nut	ASTM A36		
Gland	ASTM A276-410	ASTM A276-316		Handwheel	ASTM A536 (65-45-12)		
Gland Flange	ASTM A276-WCB			Spacer Ring	ASTM A276-410		

Class 300

Size	nps	2	2.5	3	4	5	6	8	10	12	14
A-RF	dn	50	65	75	100	125	150	200	250	300	350
	in	10.5	11.5	12.5	14.0	15.75	17.5	22.0	24.5	28.0	33.0
A-BW	in	10.5	11.5	12.5	14.0	15.75	17.5	22.0	24.5	28.0	33.0
	mm	267	292	318	357	400	445	559	622	711	838
B	in	16.9	17.8	19.2	23.0	27.4	30.6	36.2	40.8	47.3	54.3
	mm	429	452	488	584	696	777	919	1036	1201	1379
C	in	10.0	10.0	12.0	14.0	14.0	18.0	24.0	24.0	27.0	28.3
	mm	254	254	305	356	406	457	610	610	686	720
RF	lbs	75.0	100.0	130.0	203.0	294.0	421.0	715	1015	1500	2446
Wt.	kg	34	45	59	92	134	191	325	461	682	1112
BW	lbs	55	79	101	163	242	355	566	770	1218	1996
Wt.	kg	25	36	46	74	110	161	257	350	554	907

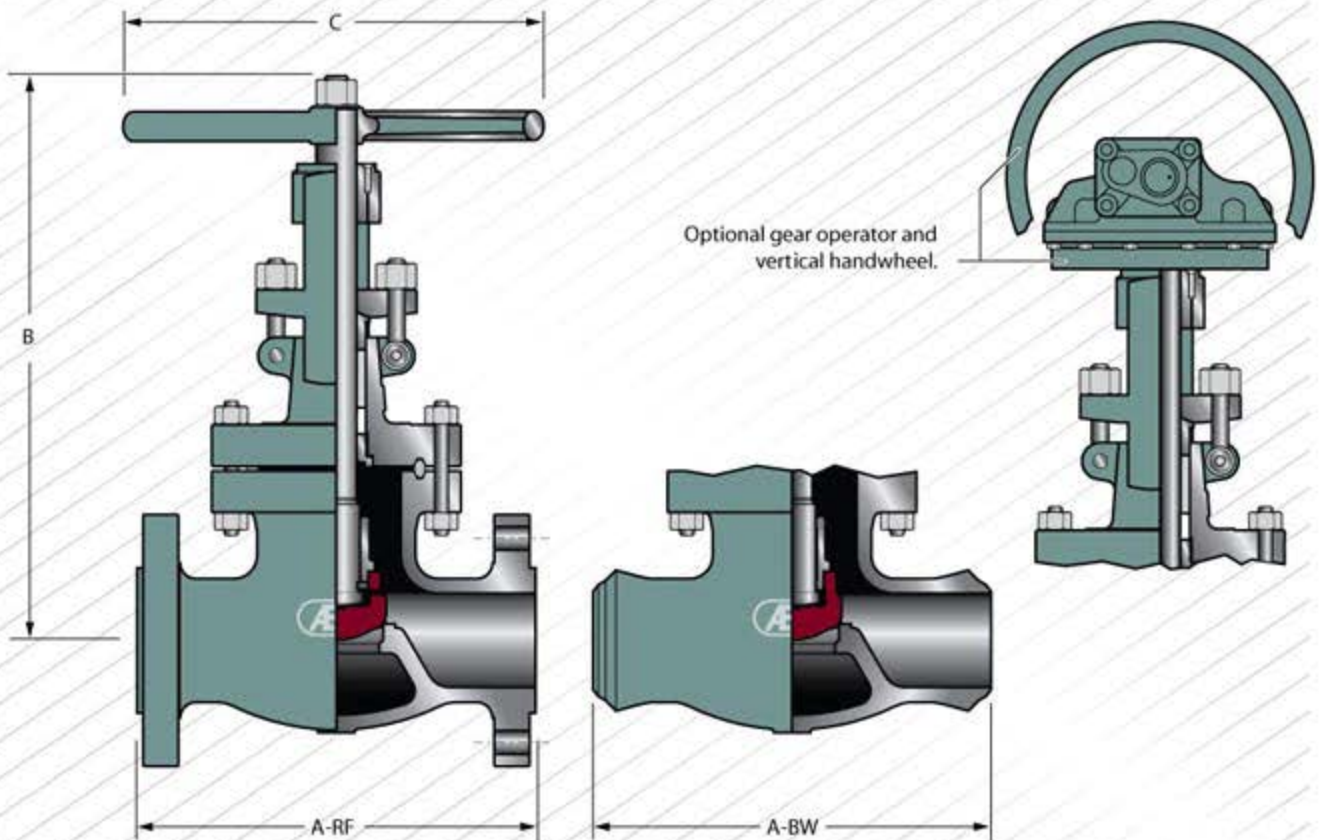
Note: Dimensions: Inches/Millimeters - Weights: Pounds/Kilograms. Larger sizes available on request. Dimensions are subject to change without notice.
** Integral seat w/HF for sizes 2" to 4".

AES Cast Carbon Steel Bolted Bonnet Valves
Product Line Technical Data

Cast Steel Bolted Bonnet Globes
Class: 600 - Sizes: 2" thru 8"

Design and Manufacturing Standards

Valve Design: ASME B16.34/API 600
Flange Dimensions: ASME B16.5, B16.47
Face-to-Face Dimensions: ASME B16.10
Tested in Accordance with: API 598 & API RP591
Recommended Spare Parts**



Typical Bill of Materials

Component	A11	A18	A22	Component	A11	A18	A22
Body		ASTM A216-WCB		Gland Bolt Pins		ASTM A36	
Disc 2" thru 4"	ASTM A276-410		ASTM A276-316	Gland Nuts		ASTM A194-2H	
Disc 5" and larger	ASTM A216-WCB/ 13% Chrome	ASTM A216-WCB/ HF	ASTM A216- WCB/316	Gland Bolts		ASTM A307-B	
Stem	ASTM A276-410		ASTM A276-316	Seat Ring	Integral ASTM A216-WCB/HF		
Bonnet	ASTM A216-WCB			Split Ring	ASTM A276-410		
*Bonnet Gasket	Soft Steel Ring Joint			Nameplate	ASTM A666-304		
Bonnet Nuts	ASTM A194-2H			Nameplate Rivets	Commercial		
Bonnet Studs	ASTM 193-B7			Disc Nut	ASTM A276-410		ASTM A276-316
Back Seat Bushing	ASTM A276-410		ASTM A276-316	Stem Nut	ASTM A439-D2		
*Packing	Graphite W/Braided Carbon Fiber End Rings			Handwheel Washer	ASTM A36		
Gland	ASTM A276-410		ASTM A276-316	Handwheel Nut	ASTM A36		
Gland Flange	ASTM A276-WCB			Handwheel	ASTM A536 (65-45-12)		
				Spacer Ring	ASTM A276-410		

Class 600

Size	nps	2	2.5	3	4	6	8
	dn	50	65	75	100	150	200
A-RF	in	11.5	13.0	14.0	17.0	22.0	26.0
	mm	292	325	256	435	559	660
A-BW	in	11.5	13.0	14.0	17.0	22.0	26.0
	mm	292	325	256	435	559	660
B	in	18.4	20.0	24.4	29.0	37.9	44.7
	mm	467	508	620	737	963	1135
C	in	10.0	10.0	14.0	18.0	24.0	24.0
	mm	254	254	356	457	610	610
RF	lbs	90	130	170	313	778	1245
Wt.	kg	41	59	77	142	354	566
BW	lbs	79	110	141	256	640	961
Wt.	kg	36	50	64	116	291	437

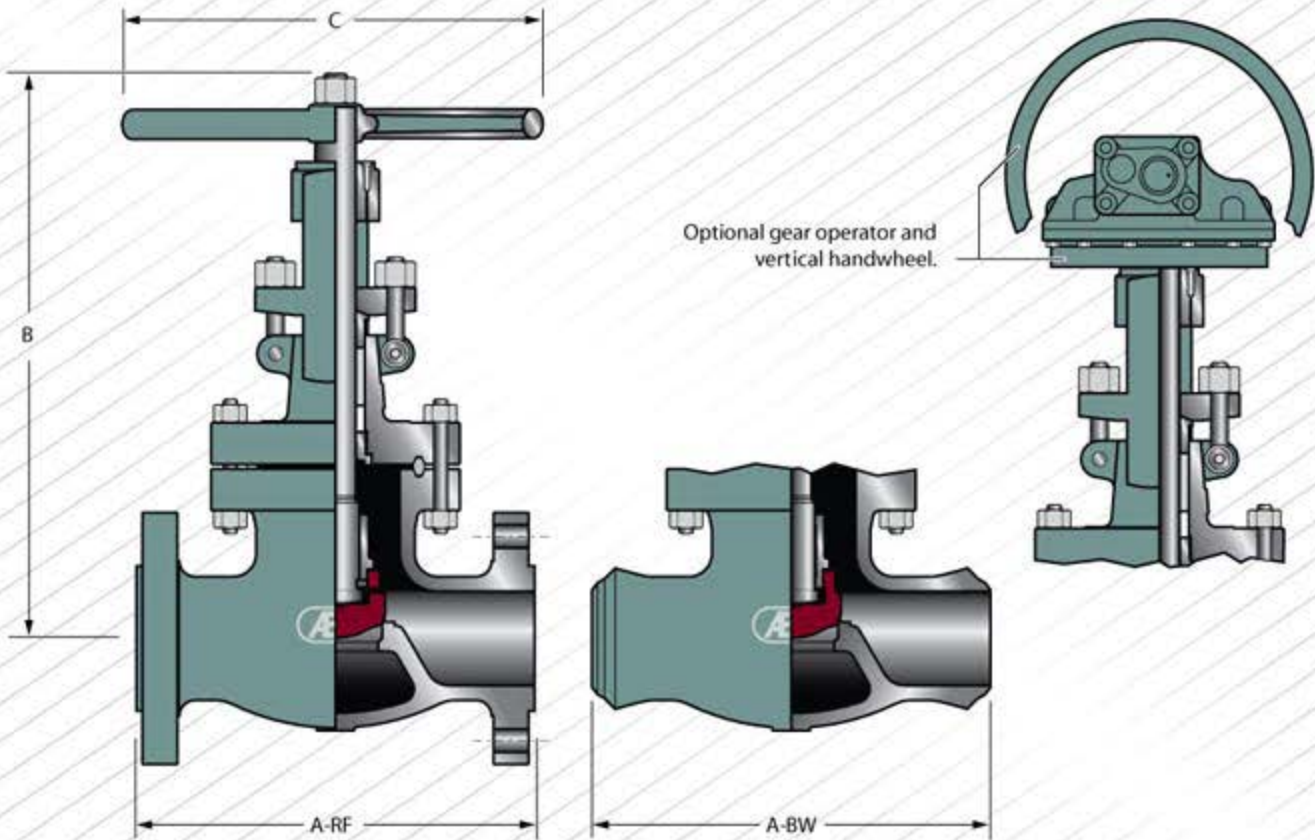
Note: Dimensions: Inches/Millimeters - Weights: Pounds/Kilograms. Larger sizes available on request. Dimensions are subject to change without notice.

AES Cast Carbon Steel Bolted Bonnet Valves
Product Line Technical Data

Cast Steel Bolted Bonnet Globes
Class: 900 - Sizes: 2" thru 8"

Design and Manufacturing Standards

Valve Design: ASME B16.34/API 600
Flange Dimensions: ASME B16.5, B16.47
Face-to-Face Dimensions: ASME B16.10
Tested in Accordance with: API 598
Recommended Spare Parts*



Typical Bill of Materials

Component	A11	A18	A22	Component	A11	A18	A22
Body		ASTM A216-WCB		Gland Bolt Pins		ASTM A36	
Disc 2" thru 4"	ASTM A276-410	ASTM A216-WCB/ HF	ASTM A276-316	Gland Nuts		ASTM A194-2H	
Disc 5" and larger	ASTM A216-WCB/ 13% Chrome			ASTM A216- WCB/316	Gland Bolts		ASTM A307-B
Stem	ASTM A276-410		ASTM A276-316	Seat Ring		Integral ASTM A216-WCB/HF	
Bonnet	ASTM A216-WCB			Split Ring		ASTM A276-410	
*Bonnet Gasket	Soft Steel Ring Joint			Nameplate		ASTM A666-304	
Bonnet Nuts	ASTM A194-2H			Nameplate Rivets		Commercial	
Bonnet Studs	ASTM 193-B7			Disc Nut		ASTM A276-410	ASTM A276-316
Back Seat Bushing	ASTM A276-410		ASTM A276-316	Stem Nut		ASTM A439-D2	
*Packing	Graphite W/Braided Carbon Fiber End Rings			Handwheel Washer		ASTM A36	
Gland	ASTM A276-410		ASTM A276-316	Handwheel Nut		ASTM A36	
Gland Flange	ASTM A276-WCB			Handwheel		ASTM A536 (65-45-12)	
				Spacer Ring		ASTM A276-410	

Class 900

Size	nps	2	3	4	6	8
	dn	50	75	100	150	200
A-RF	in	14.5	15.0	18.0	24.0	29.0
	mm	368	381	457	610	737
A-BW	in	14.5	15.0	18.0	24.0	29.0
	mm	368	381	457	610	737
B	in	22.6	26.0	30.6	39.6	60.1
	mm	574	660	777	1006	1527
C	in	13.8	17.7	17.7	22.0	28.3
	mm	350	450	450	560	720
RF	lbs	198	335	440	1675	2090
Wt.	kg	90	152	200	761	950
BW	lbs	176	297	376	1144	1634
Wt.	kg	80	135	171	520	743

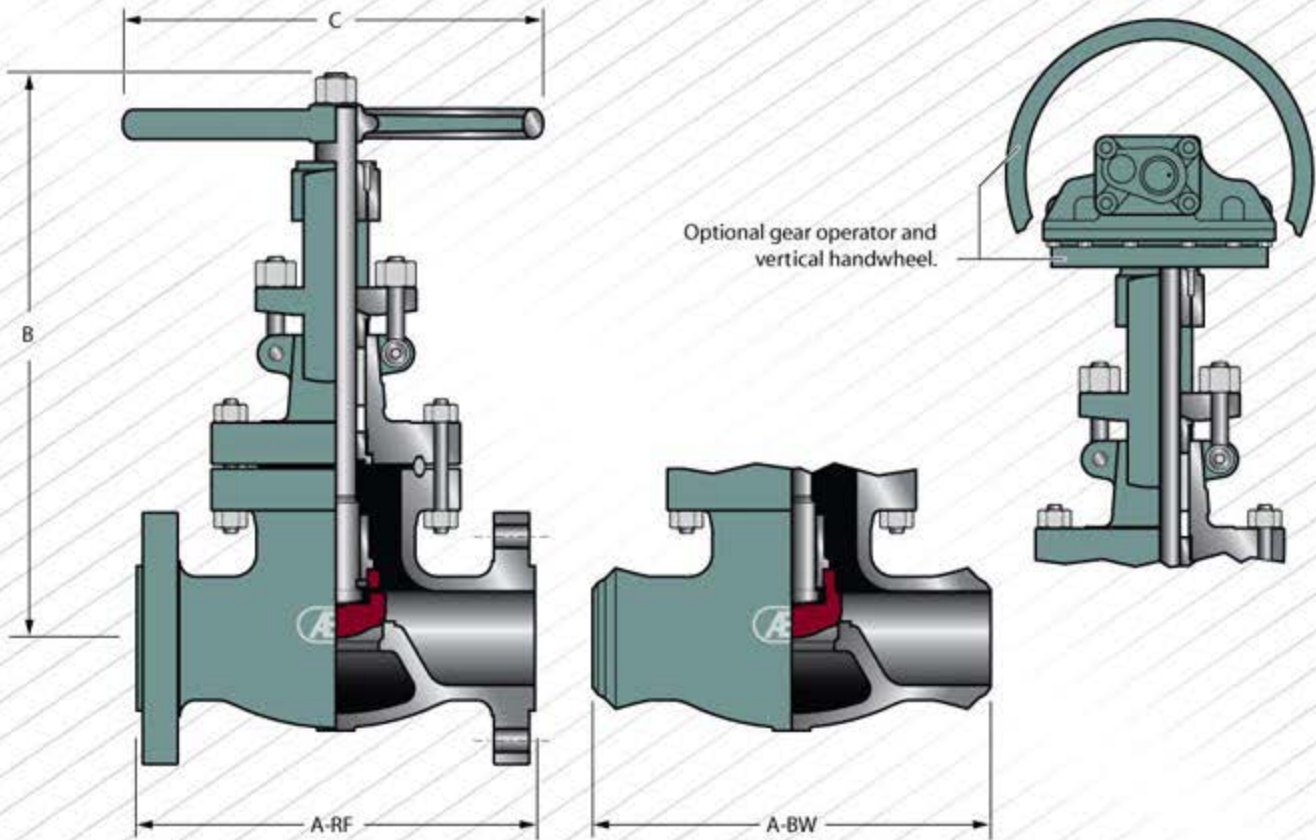
Note: Dimensions: Inches/Millimeters - Weights: Pounds/Kilograms. Larger sizes available on request. Dimensions are subject to change without notice.

AES Cast Carbon Steel Bolted Bonnet Valves
 Product Line Technical Data

Cast Steel Bolted Bonnet Globes
 Class: 1500 - Sizes: 2" thru 6"

Design and Manufacturing Standards

Valve Design: ASME B16.34/API 600
Flange Dimensions: ASME B16.5, B16.47
Face-to-Face Dimensions: ASME B16.10
Tested in Accordance with: API 598
Recommended Spare Parts*



Typical Bill of Materials

Component	A11	A18	A22	Component	A11	A18	A22
Body		ASTM A216-WCB		Gland Bolt Pins		ASTM A36	
Disc 2" thru 4"	ASTM A276-410		ASTM A276-316	Gland Nuts		ASTM A194-2H	
Disc 5" and larger	ASTM A216-WCB/ 13% Chrome	ASTM A216-WCB/ HF	ASTM A216- WCB/316	Gland Bolts		ASTM A307-B	
Stem	ASTM A276-410		ASTM A276-316	Seat Ring		Integral ASTM A216-WCB/HF	
Bonnet	ASTM A216-WCB			Split Ring		ASTM A276-410	
*Bonnet Gasket	Soft Steel Ring Joint			Nameplate		ASTM A666-304	
Bonnet Nuts	ASTM A194-2H			Nameplate Rivets		Commercial	
Bonnet Studs	ASTM 193-B7			Disc Nut	ASTM A276-410		ASTM A276-316
Back Seat Bushing	ASTM A276-410		ASTM A276-316	Stem Nut		ASTM A439-D2	
*Packing	Graphite W/Braided Carbon Fiber End Rings			Handwheel Washer		ASTM A36	
Gland	ASTM A276-410		ASTM A276-316	Handwheel Nut		ASTM A36	
Gland Flange	ASTM A276-WCB			Handwheel		ASTM A536 (65-45-12)	
				Spacer Ring		ASTM A276-410	

Class 1500

Size	nps	2	3	4	6
	dn	50	75	100	150
A-RF	in	14.5	18.5	21.5	27.75
	mm	368	470	546	705
A-BW	in	14.5	18.5	21.5	27.75
	mm	368	470	546	705
B	in	19.6	25.6	30.8	36.5
	mm	498	650	782	927
C	in	13.8	17.7	19.7	25.2
	mm	350	450	500	640
RF	lbs	209	551	959	1191
Wt.	kg	95	250	436	541
BW	lbs	143	460	830	996
Wt.	kg	65	209	377	453

Note: Dimensions: Inches/Millimeters - Weights: Pounds/Kilograms. Larger sizes available on request. Dimensions are subject to change without notice.



QUALITY PARTICIPATION

AES is a member of the following American Standards Societies.

ASQC

American Society for Quality Control

ASNT

American Society for Non-Destructive Testing

ASM

American Society of Materials

SME

Society of Mechanical Engineers

API*

American Petroleum Institute

ASME

American Society of Mechanical Engineers

NACE*

National Association of Corrosion Engineers

AWS

American Welding Society

ASTM*

American Society for Testing and Materials

* Voting member

Cast Steel Bolted Bonnet Angle Valves

Sizes: 2" thru 12"

Pressure Class: 150 thru 600



Serving Your Energy Needs

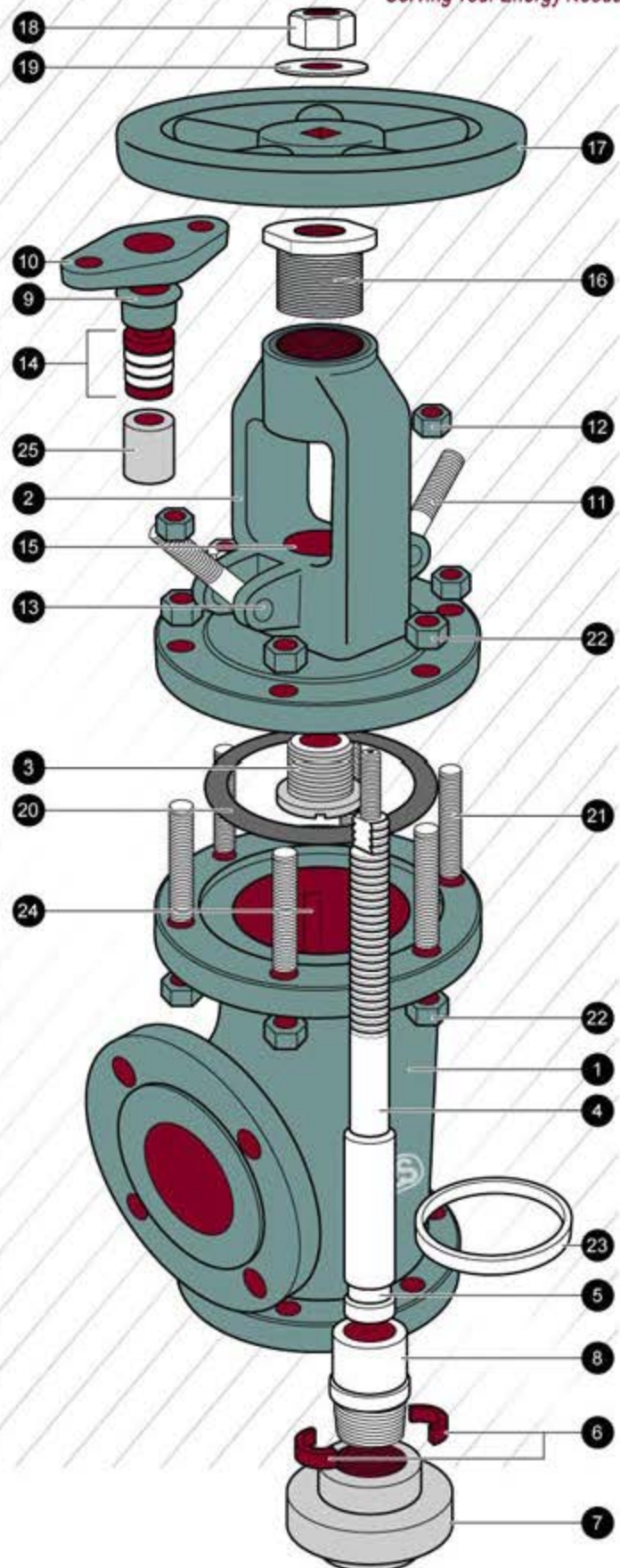




Serving Your Energy Needs

Typical AES Cast Steel Bolted Bonnet Angle Valve Expanded View

- 1. Body:** AES cast steel bodies provide low flow resistance and optimum strength and performance.
- 2. Bonnet:** AES bonnet assemblies are built to the same standards as the bodies.
- 3. Back Seat Bushing:** The back seat, when engaged with the stem head, provides a stable shutoff to the stuffing box which isolates the packing from flow exposure.
- 4. Stem:** The stem inserts vertically into the disc.
- 5. Lock Groove:** The lock groove receives the split lock ring which allows the disc nut to lift the disc during cycling.
- 6. Split Ring:** The split ring allows the disc nut to lift the disc during cycling.
- 7. Disc:** AES disc is machined to the tightest tolerances to ensure trouble free shutoff and cycling.
- 8. Disc Nut:** The disc nut, in conjunction with the split lock ring, secures the disc to the stem.
- 9. Gland:** Compresses the packing to create a stem seal above the back seat, between the bonnet and stem.
- 10. Gland Flange:** Applies pressure to the gland for accurate packing compression.
- 11. & 12. Gland Bolts & Nuts:** The gland bolt and nut allows for easy adjustments for packing compression.
- 13. Gland Bolt Pin:** The gland bolt pin secures the gland bolts to the yoke & bonnet.
- 14. Packing:** The packing creates a seal above the back seat, between the bonnet and stem.
- 15. Stuffing Box:** The stuffing box contains the packing.
- 16. Stem Nut:** The stem nut provides a precision guide for proper stem alignment.
- 17. Handwheel:** The handwheel cycles the valve.
- 18. Handwheel Nut:** The handwheel nut secures the handwheel to the bonnet assembly.
- 19. Handwheel Washer:** The washer helps to prevent loosening or distributes pressure evenly.
- 20. Bonnet Gasket:** The bonnet gasket creates a leakproof seal between the bonnet and body.
- 21. & 22. Bonnet Studs & Nuts:** The bonnet studs and nuts secure the bonnet to the body.
- 23. Seat Ring:** To ensure a stable shutoff, the seat rings is aligned and seal-welded into the valve, then precision ground for optimal seating.
- 24. Disc Guide:** The disc guides provide a stable track for keeping the disc aligned with the seat during cycling.
- 25. Spacer Ring:** Assists the packing rings in creating a seal above the back seat, between the bonnet and stem.



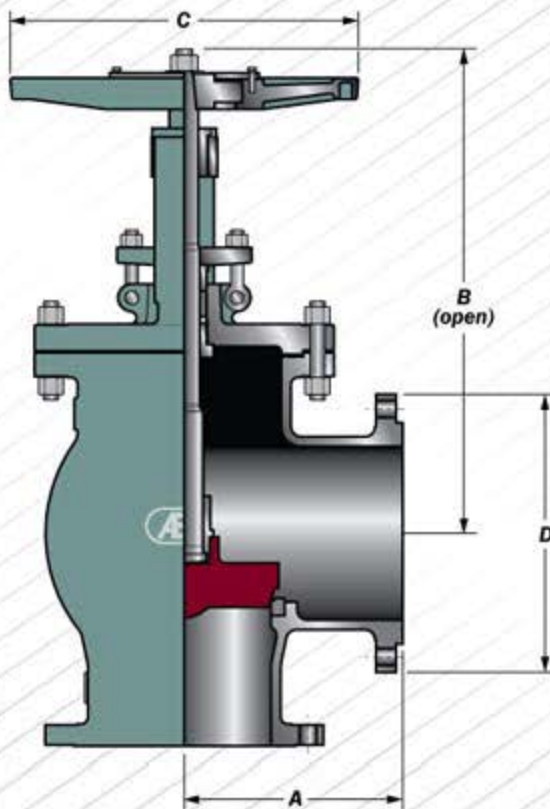
AES Cast Carbon Steel Bolted Bonnet Valves
Product Line Technical Data

Cast Steel Bolted Bonnet Angles

Class: 150 - Sizes: 2" thru 12"

Design and Manufacturing Standards

Valve Design: ASME B16.34/API 600
Flange Dimensions: ASME B16.5, B16.47
Face-to-Face Dimensions: ASME B16.10
Tested in Accordance with: API 598
Recommended Spare Parts*



Typical Bill of Materials

Component	A11	A18	A22	Component	A11	A18	A22
Body	ASTM A216 GR.WCB			Packing	Graphite w/Braided Carbon Fiber End Rings		
Seat Ring	ASTM A105/HF			Gland Bolt Pins	ASTM A36		
Disc 2" thru 4"	ASTM A276-410	ASTM A216-316		Gland Bolts	ASTM 193-B7		
Disc 5" and larger	ASTM A216-WCB/ 13% Chrome	ASTM A216-WCB/ HF	ASTM A216- WCB/316	Gland	ASTM A276-410	ASTM A276-316	
Disc Nut	ASTM A276-410		ASTM A276-316	Gland Flange	ASTM A216-WCB		
Stem	ASTM A276-410		ASTM A276-316	Gland Nuts	ASTM A194-2H		
*Bonnet Gasket	Spiral Wound 316 Stainless Steel/Graphite			Stem Nut	ASTM A439-D2		
Bonnet	ASTM A216-WCB			Split Ring	ASTM A276-410		
Bonnet Studs	ASTM 193-B7			Handwheel Washer	ASTM A36		
Bonnet Nuts	ASTM A194-2H			Handwheel Nut	ASTM A36		
Back Seat Bushing	ASTM A276-410		ASTM A276-316	Handwheel	ASTM A539 Type (65-45-12)		
				Spacer Ring	ASTM A276-410	ASTM A276-316	

Class 150

Size	nps	2	3	4	6	8	10	12
	dn	50	75	100	150	200	250	300
A	in	4.0	4.75	5.75	8.0	9.75	12.25	13.75
	mm	107	121	146	203	248	311	349
B	in	15.2	16.9	20.4	21.8	27.4	31	37.8
	mm	386	429	518	554	696	787	960
C	in	8	10	12	15	18	22	24
	mm	203	254	305	381	457	559	610
D	in	6	7.5	9	11	13.5	16	19
	mm	152	191	229	279	343	406	483
RF	lbs	57	84	141	234	399	611	794
Wt.	kg	26	38	64	106	181	278	361

Note: Dimensions: Inches/Millimeters - Weights: Pounds/Kilograms. Larger sizes available on request. Dimensions are subject to change without notice.

AES Cast Carbon Steel Bolted Bonnet Valves

Product Line Technical Data

Cast Steel Bolted Bonnet Angles

Class: 300 - Sizes: 2" thru 12"

Design and Manufacturing Standards

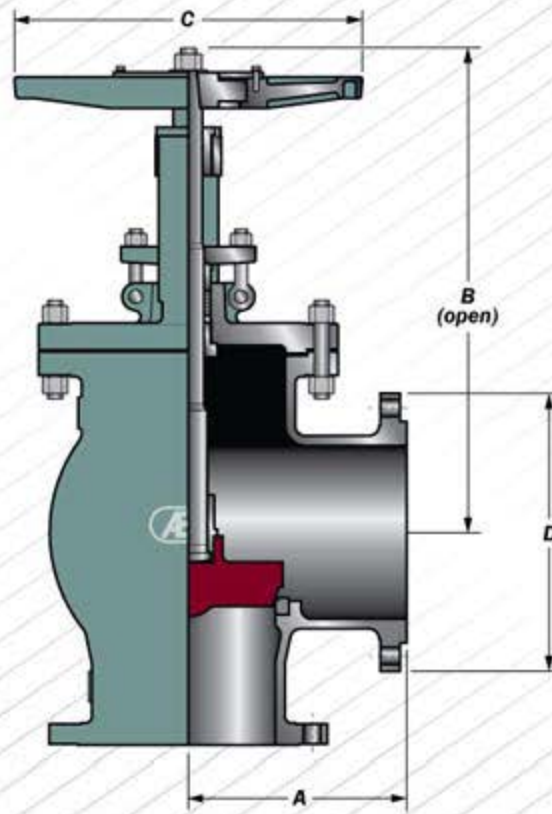
Valve Design: ASME B16.34/API 600

Flange Dimensions: ASME B16.5, B16.47

Face-to-Face Dimensions: ASME B16.10

Tested in Accordance with: API 598

Recommended Spare Parts*



Typical Bill of Materials

Component	A11	A18	A22	Component	A11	A18	A22
Body	ASTM A216 GR.WCB			Packing	Graphite w/Braided Carbon Fiber End Rings		
Seat Ring	ASTM A105/HF			Gland Bolt Pins	ASTM A36		
Disc 2" thru 4"	ASTM A276-410	ASTM A216-WCB/ HF	ASTM A276-316	Gland Bolts	ASTM 193-B7		
Disc 5" and larger	ASTM A216-WCB/ 13% Chrome		ASTM A216- WCB/316	Gland	ASTM A276-410	ASTM A276-316	
Disc Nut	ASTM A276-410		ASTM A276-316	Gland Flange	ASTM A216-WCB		
Stem	ASTM A276-410		ASTM A276-316	Gland Nuts	ASTM A194-2H		
*Bonnet Gasket	Spiral Wound 316 Stainless Steel/Graphite			Stem Nut	ASTM A439-D2		
Bonnet	ASTM A216-WCB			Split Ring	ASTM A276-410		
Bonnet Studs	ASTM 193-B7			Handwheel Washer	ASTM A36		
Bonnet Nuts	ASTM A194-2H			Handwheel Nut	ASTM A36		
Back Seat Bushing	ASTM A276-410		ASTM A276-316	Handwheel	ASTM A539 Type (65-45-12)		
				Spacer Ring	ASTM A276-410	ASTM A276-316	

Class 300

Size	nps	2	3	4	6	8	10	12
	dn	50	75	100	150	200	250	300
A	in	5.25	6.25	7	8.75	11	12.25	14
	mm	133	159	178	222	279	311	356
B	in	15	16.9	21.7	28	30.7	37.5	41.6
	mm	381	429	551	711	780	953	1049
C	in	10	12	14	17	24	24	27
	mm	254	305	356	432	610	610	686
D	in	6.5	8.25	10	12.5	15	17.5	20.5
	mm	165	210	254	318	381	445	521
RF	lbs	68	108	198	392	560	934	1288
Wt.	kg	31	49	90	178	255	425	586

Note: Dimensions: Inches/Millimeters - Weights: Pounds/Kilograms. Larger sizes available on request. Dimensions are subject to change without notice.

AES Cast Carbon Steel Bolted Bonnet Valves

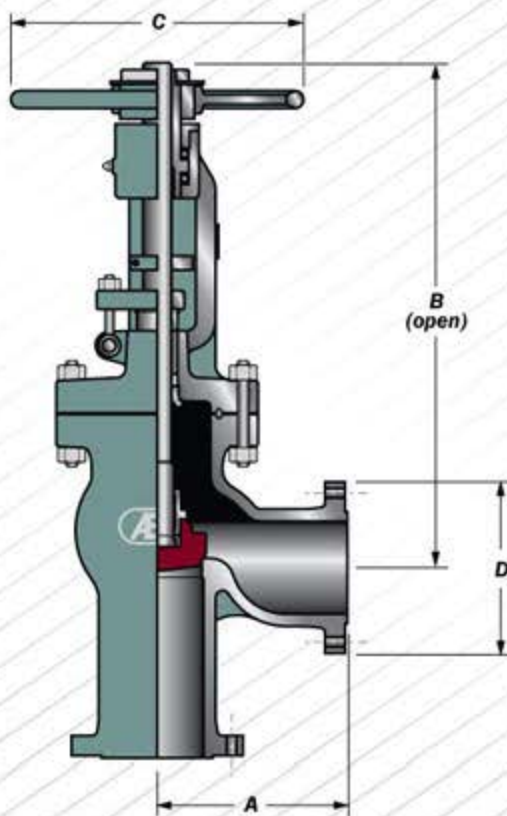
Product Line Technical Data

Cast Steel Bolted Bonnet Angles

Class: 600 - Sizes: 2" thru 8"

Design and Manufacturing Standards

Valve Design: ASME B16.34/API 600
Flange Dimensions: ASME B16.5, B16.47
Face-to-Face Dimensions: ASME B16.10
Tested in Accordance with: API 598
Recommended Spare Parts*



Typical Bill of Materials

Component	A11	A18	A22	Component	A11	A18	A22
Body	ASTM A216 GR.WCB			Packing	Graphite w/Braided Carbon Fiber End Rings		
Seat Ring	ASTM A105/HF			Gland Bolt Pins	ASTM A36		
Disc 2" thru 4"	ASTM A276-410	ASTM A216-WCB/ HF	ASTM A276-316	Gland Bolts	ASTM 193-B7		
Disc 5" and larger	ASTM A216-WCB/ 13% Chrome		ASTM A216- WCB/316	Gland	ASTM A276-410	ASTM A276-316	
Disc Nut	ASTM A276-410		ASTM A276-316	Gland Flange	ASTM A216-WCB		
Stem	ASTM A276-410		ASTM A276-316	Gland Nuts	ASTM A194-2H		
*Bonnet Gasket	Spiral Wound 316 Stainless Steel/Graphite			Stem Nut	ASTM A439-D2		
Bonnet	ASTM A216-WCB			Split Ring	ASTM A276-410		
Bonnet Studs	ASTM 193-B7			Handwheel Washer	ASTM A36		
Bonnet Nuts	ASTM A194-2H			Handwheel Nut	ASTM A36		
Back Seat Bushing	ASTM A276-410		ASTM A276-316	Handwheel	ASTM A539 Type (65-45-12)		
				Spacer Ring	ASTM A276-410	ASTM A276-316	

Class 600

Size	nps	2	2.5	3	4	6	8
	dn	50	75	100	150	200	250
A	in	5.75	6.5	7.0	8.5	11.0	13.0
	mm	146	165	178	216	279	330
B	in	18.9	20.9	19.8	22.2	28.2	38.5
	mm	480	531	503	564	716	978
C	in	8.8	9.8	11.0	14.0	17.7	24.8
	mm	224	249	279	356	450	630
D	in	6.5	7.5	8.3	9.0	14.0	16.5
	mm	165	191	211	229	356	419
RF	lbs	79	110	141	256	640	961
Wt.	kg	36	50	64	116	291	437

Note: Dimensions: Inches/Millimeters - Weights: Pounds/Kilograms. Larger sizes available on request. Dimensions are subject to change without notice.

Example: 2F1150A2A2RL

2"

Ball Full Port Floating

ANSI150

A216 WCB

A216 WCB

RF X RF

Level Operated

1	2	3	4	5	6
Bore Size	Valve Type	Pressure Class	Body Material	Trim Material	End Connections
.01 = 1/16"	Ball Valves = B F5 = Ball Full Port 2-Piece Trunnion TV7 = Ball Full Port 3-Way, 35° Top Entry F1 = Ball Full Port Floating F2 = Ball Full Port Trunnion F3 = Ball Full Port Top Entry F4 = Ball Full Port 4-Way F5 = Ball Full Port 3-Way 90° Top Entry F7 = Ball Regular Port 3-Way, 35° Top Entry F8 = Ball Full Port Uni Body N/P = Ball Multi-Port BP = Ball Plug R1 = Ball Reduced Port Floating R2 = Ball Reduced Port Trunnion R3 = Ball Reduced Port Top Entry R4 = Ball Regular Port 4-Way R5 = Ball Regular Port 2-Piece Trunnion R6 = Ball Reduced Port 90° Top Entry R7 = DBE Full Port R8 = DBE Reduced Port Check Valve = C AC = Angle Check Valve AL = Angle Stop Check BC = Ball Check Valve BF = Excess Flow Check Valve HL = Horizontal Lift Check HP = Horizontal Piston Check IC = Incline Check Valve IV = Inverted Vent. Check Valve LC = Lift Check Y3 = Lift Check Y-Pattern NC = Nozzle Check Valve PC = Piston Check P7 = Piston Check Y-Pattern Pressure Seal Y4 = Piston Check Y-Pattern ST = Stop Check S1 = Stop Check Y-Pattern SC = Swing Check F5 = Swing Check Full Port. NS = Swing Check Non-Slam P3 = Swing Check Pressure Seal HS = Swing Check Reduce Port YC = Swing Check Y-Pattern TC = Tank Check Valve VC = Vent Check Valve WC = Wafer Check DC = Wafer Check Dual Plate U2 = Wafer Check Dual Plate w/ Body Liner	ANSI 150 = ANSI 150 175 = ANSI 175 300 = ANSI 300 400 = ANSI 400 600 = ANSI 600 900 = ANSI 900 1500 = ANSI 1500 2500 = ANSI 2500 4500 = ANSI 4500 API 5.0K = API 5000 7.5K = API 7500 10K = API 10000 12K = API 12000 15K = API 15000 WOG (Water, Oil, Gas) 1.0W = 1000 WOG 3.0W = 3000 WOG 3.6W = 3600 WOG 6.0W = 6000 WOG 8.0W = 8000 WOG	A1 = A135 (Forged Carbon Steel) A2 = A215 WCB/WCC (Cast Carbon Steel) F7 = A150-F7 (Forged Low Temperature Carbon Steel) CL = A352 LCL (Cast Low Temperature Carbon Steel) CT = A352-LCT (Cast Low Temperature Carbon Steel) CC = A352 LCC (Cast Low Temperature Carbon Steel) TN = Titanium (UNS R50400) DT = Ductile Iron (ASTM A35) D0 = A350-LF3/A352-LC3 (Forged/Cast Low Temp. Alloy) B1 = A182 F1/A217 WCL (Forged & Cast Alloy Steel) B2 = A182 F1/A217 WCL (Forged & Cast Alloy Steel) B3 = A182 F2/A217 WC9 (Forged & Cast Alloy Steel) B4 = A182-F5/A217 C5 (Forged & Cast Alloy Steel) B5 = A182-F9/A217 C12 (Forged & Cast Alloy Steel) B6 = A182-F9/A217 C12A (Forged & Cast Alloy Steel) J0 = A182-F304 (Cast Stainless Steel) J1 = A182-F304L (Cast Stainless Steel) J2 = A182-F304H (Cast Stainless Steel) J3 = A182-F316 (Cast Stainless Steel) J4 = A182-F316L (Cast Stainless Steel) J5 = A182-F316H (Cast Stainless Steel) J6 = A182-F316L1 (Cast Stainless Steel) J7 = A182-F321 (Cast Stainless Steel) J8 = A182-F321H (Cast Stainless Steel) J9 = A182-F347 (Cast Stainless Steel) JA = A182-F347H (Cast Stainless Steel) JB = A182-F317 (Cast Stainless Steel) JC = A182-F317L (Cast Stainless Steel) KD = A351-CF8 (Forged Stainless Steel) KL = A351-CF8 (Forged Stainless Steel) K2 = A351-CF10 (Forged Stainless Steel) K3 = A351-CF8M (Forged Stainless Steel) K4 = A351-CF3M (Forged Stainless Steel) K5 = A351-CF11M (Forged Stainless Steel) K6 = A351-CF8C (Forged Stainless Steel) K7 = A351-CG3M (Forged Stainless Steel) K8 = Alloy 20 (A182-F20/A351-CN7M) KA = Duplex 2205 (A182-F51/A351-CJ3M/N) KB = Super Duplex 2507 (A182-F53/A351-CD1M/Cu) KC = Super Austenitic 6Mo (A182-F11/A351-CK3M/Cu/N) KU = Super Duplex F45 (A182-F45) NU = Nickel (UNA N02200) N1 = Nickel Alloy 901L (UNS N08904) N2 = Incoloy 800 (UNS N08800) N3 = Incoloy 825 (UNS N08825) N4 = Inconel 600 (UNS N06600) N5 = Inconel 625 (UNS N06625) N6 = Hastelloy C-276 (UNS N10276) N7 = Monel 400 (UNS N04400) N8 = Monel 500 (UNS N05500) A3 = A285 Gr-B B7 = Nickel Aluminum Bronze (B148Gr-800) NC = EN1582 CC192K A4 = A178	API 609/602 Trim C1 = 1 C2 = 7 C3 = 3 C4 = 4 C5 = 5 C6 = 5a C6 = 6 C7 = 7 C8 = 8 C9 = 8a C9 = 9 C10 = 10 C11 = 11 C12 = 12 C12a = 12a C13 = 13 C14 = 14 C14a = 14a C15 = 15 C16 = 16 C17 = 17 C18 = 18 API 6A Trim AA = A BB = BB CC = CC DD = DD-NL EE = EE-NJ EE = EE-0.5 EE = EE-1.5 FF = FF-0.5 FF = FF-1.5 FF = FF-NL HH = HH-NL	C = Clamp F = FF x FF I = RTI x RTI R = RF x RF S = SW x SW T = TE x TE W = WE x WE X = Special L = Lub Ends U = Lugs V = Water Y = SW x FNPT



HOW TO ORDER VALVES

Cast Steel Bolted Cover Swing Check Valves

Sizes: 2" thru 24"

Pressure Class: 150 thru 1500



Serving Your Energy Needs



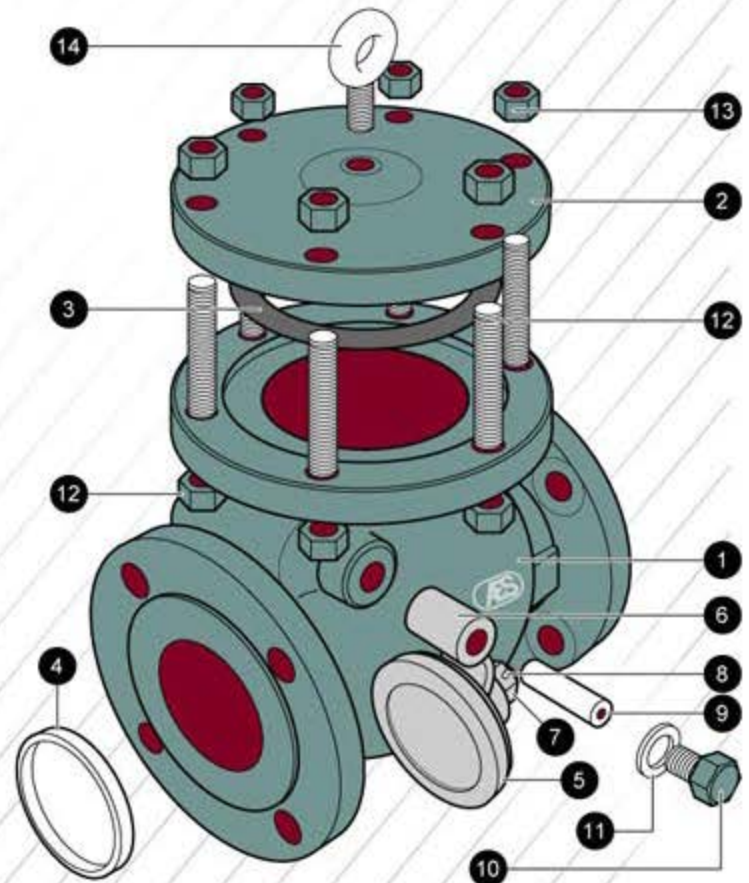


Serving Your Energy Needs

Typical AES Cast Steel Bolted Cover Swing Check Valve Expanded View

Note: Classes 150 & 300 uses external hinge pin

- 1. Body:** AES cast steel bodies provide low resistance flow and optimum strength and performance.
- 2. Cover:** The cover allows access to internal components.
- 3. Cover Gasket:** The cover gasket creates a leakproof seal between the cover and body.
- 4. Seat Ring:** To ensure a stable shutoff, the seat ring is aligned into the valve, then precision ground for optimal seating.
- 5. Disc:** The disc allows uni-directional flow and restricts back flow with trouble free shutoff.
- 6. Swing Arm:** The swing arm allows the disc to open and close.
- 7. & 8. Disc Nut & Pin:** The disc nut and pin secures the disc to the swing arm.
- 9. Hinge Pin:** The hinge pin provides a stable mechanism for the swing arm to operate.
- 10. Plug:** The plug secures the arm pin inside the valve.
- 11. Plug Gasket:** The plug gasket creates a leak-proof seal between the plug and body.
- 12. & 13. Cover Studs & Nuts:** The cover studs and nuts secure the bonnet to the body.
- 14. Eyebolt:** The eyebolt is use to aid in lifting the valve.

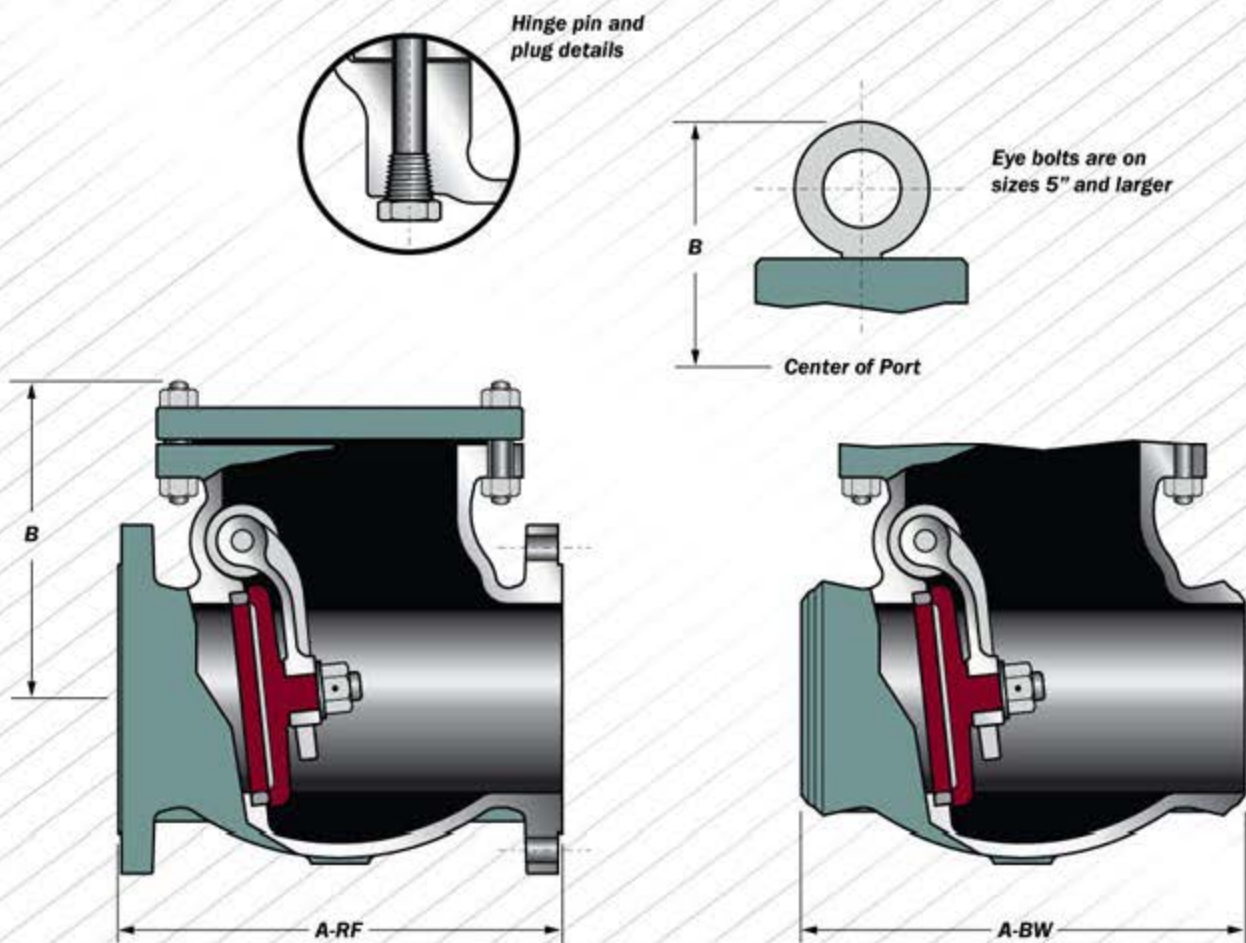


AES Cast Carbon Steel Bolted Bonnet Valves
Product Line Technical Data

Cast Steel Bolted Cover Swing Checks
Class: 150 - Sizes: 2" thru 24"

Design and Manufacturing Standards

Valve Design: ASME B16.34/API 600
Flange Dimensions: ASME B16.5, B16.47
Face-to-Face Dimensions: ASME B16.10
Tested in Accordance with: API 598
Recommended Spare Parts*



Typical Bill of Materials

Component	A11	A18	A22	Component	A11	A18	A22
Body	ASTM A216-WCB			Name Plate	304 Stainless Steel		
Cover	ASTM A105N			Plug Gasket	Stainless Steel		
Disc 2" thru 5"	ASTM A182-F6a	ASTM A182-F6a /HF	ASTM A182-F316	Cover Bolt	ASTM A193-B7		
Disc 6" and larger	ASTM A216-WCB /13% Chrome	ASTM A216-WCB/ HF	ASTM A216-WCB/ 316 Faced	Cover Nut	AISI 1020		
Swing Arm	ASTM A216-WCB			Plug	ASTM A276-410	ASTM A276-316	
Seat Ring	ASTM A105/HF			Disc Pin	ASTM A276-316		
*Cover Gasket	Spiral Wound 316 Stainless Steel/Graphite			Disc Nut	A194-8		
Hinge Pin	ASTM A276-410		ASTM A276-316	Eye Bolt 5" thru 24"	Carbon Steel		

Class 150

Size	nps	2	2.5	3	4	5	6	8	10	12	14	16	18	20	24
A-RF	dn	50	75	100	150	125	150	200	250	300	350	400	450	500	600
	in	8.0	8.5	9.5	11.5	13.0	14.0	19.5	24.5	27.5	31.0	34.0	38.5	38.5	51.0
A-BW	mm	203	216	241	292	330	356	495	622	699	787	864	978	978	1295
	in	8.0	8.5	9.5	11.5	13.0	14.0	19.5	24.5	27.5	31.0	34.0	38.5	38.5	51.0
B	mm	203	216	241	292	330	356	495	622	699	787	864	978	978	1295
	in	6.8	7.4	7.7	8.5	12.3	12.8	14.3	17.2	17.9	19.6	21.2	24.2	27.4	30.0
RF	lbs	173	188	196	216	315	325	363	437	455	498	538	615	696	762
	kg	36	51	64	98	135	181	298	463	688	898	1147	1367	1808	2866
BW	lbs	29	38	49	73	110	146	243	421	591	766	979	1190	1585	2250
	kg	13	17	22	33	50	66	110	191	269	348	445	541	720	1123

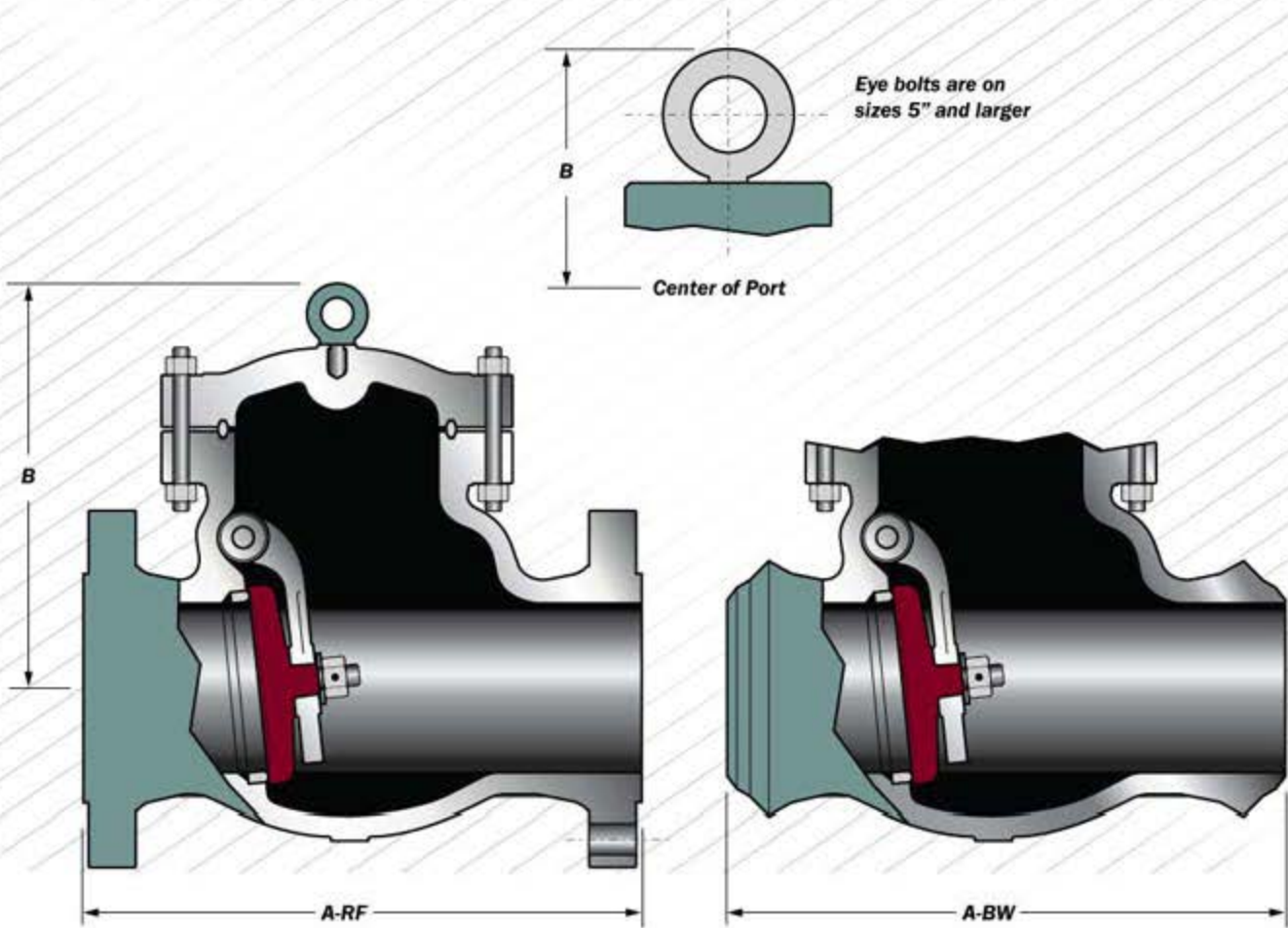
Note: Dimensions: Inches/Millimeters - Weights: Pounds/Kilograms. Larger sizes available on request. Dimensions are subject to change without notice.

AES Cast Carbon Steel Bolted Bonnet Valves
Product Line Technical Data

Cast Steel Bolted Cover Swing Checks
Class: 1500 - Sizes: 2" thru 8"

Design and Manufacturing Standards

Valve Design: ASME B16.34/API 600
Flange Dimensions: ASME B16.5, B16.47
Face-to-Face Dimensions: ASME B16.10
Tested in Accordance with: API 598
Recommended Spare Parts*



Typical Bill of Materials

Component	A11	A18	A22	Component	A11	A18	A22
Body	ASTM A216-WCB			Name Plate	304 Stainless Steel		
Cover	ASTM A105N			Washer	Stainless Steel		
Disc 2" thru 5"	ASTM A182-F6a	ASTM A182-F6a /HF	ASTM A182-F316	Cover Bolt	ASTM A193-B7		
Disc 6" and larger	ASTM A216-WCB /13% Chrome	ASTM A216-WCB/ HF	ASTM A216-WCB/ 316 Faced	Cover Nut	ASTM A276-410	ASTM A276-316	
Swing Arm	ASTM A216-WCB			Plug	AISI 1020		
Seat Ring	ASTM A105/HF			Pin	ASTM A276-316		
*Cover Gasket	Soft Steel Ring Joint			Hex Nut	A194-8		
Hinge Pin	ASTM A276-410		ASTM A276-316	Eye Bolt 5" thru 24"	Carbon Steel		

Class 1500

Size	nps	2	2.5	3	4	6	8
	dn	50	75	100	150	200	203
A-RF	in	14.5	16.5	18.5	21.5	27.8	32.8
	mm	368	419	470	546	706	833
A-BW	in	14.5	16.5	18.5	21.5	27.8	32.8
	mm	368	419	470	546	706	833
B	in	13.1	13.7	14.8	15.2	19.2	27.0
	mm	333	348	376	386	488	686
RF	lbs	165	243	284	462	940	1030
Wt.	kg	75	110	129	269	427	468
BW	lbs	153	223	256	425	895	985
WL	kg	70	101	116	193	407	448

Note: Dimensions: Inches/Millimeters - Weights: Pounds/Kilograms. Larger sizes available on request. Dimensions are subject to change without notice.

AES Cast Carbon Steel Bolted Bonnet Valves

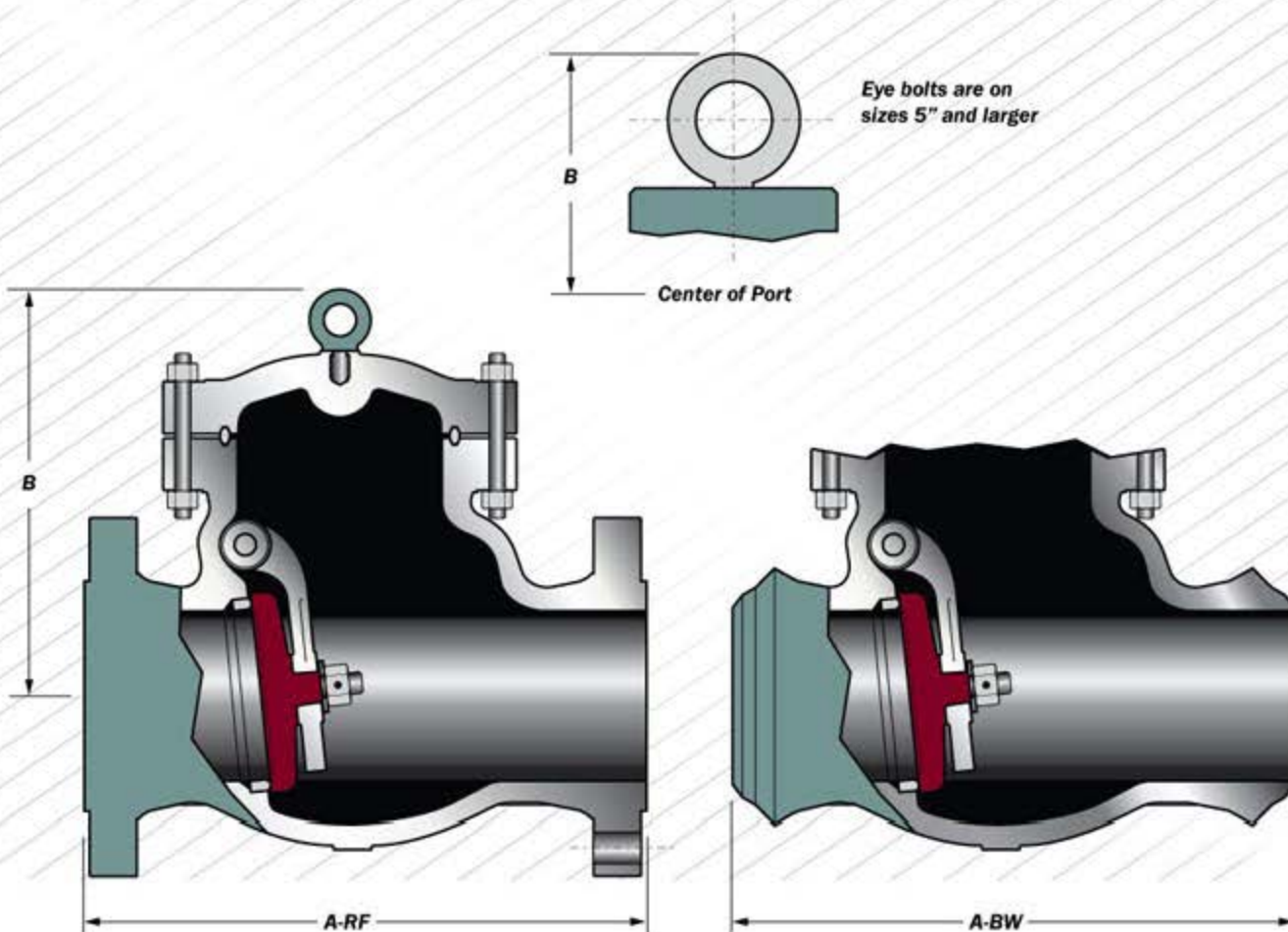
Product Line Technical Data

Cast Steel Bolted Cover Swing Checks

Class: 600 - Sizes: 2" thru 14"

Design and Manufacturing Standards

Valve Design: ASME B16.34/API 600
Flange Dimensions: ASME B16.5, B16.47
Face-to-Face Dimensions: ASME B16.10
Tested in Accordance with: API 598
Recommended Spare Parts*



Typical Bill of Materials

Component	A11	A18	A22	Component	A11	A18	A22
Body	ASTM A216-WCB			Name Plate	304 Stainless Steel		
Cover	ASTM A105N			Washer	Stainless Steel		
Disc 2" thru 5	ASTM A182-F6a	ASTM A182-F6a /HF	ASTM A182-F316	Cover Bolt	ASTM A193-B7		
Disc 6" and larger	ASTM A216-WCB /13% Chrome	ASTM A216-WCB/ HF	ASTM A216-WCB/ 316 Faced	Cover Nut	ASTM A276-410	ASTM A276-316	
Swing Arm	ASTM A216-WCB			Plug	AISI 1020		
Seat Ring	ASTM A105/HF			Pin	ASTM A276-316		
*Cover Gasket	Soft Steel Ring Joint			Hex Nut	A194-8		
Hinge Pin	ASTM A276-410		ASTM A276-316	Eye Bolt 5" thru 24"	Carbon Steel		

Class 600

Size	nps	2	2.5	3	4	5	6	8	10	12	14
	dn	50	75	100	150	125	150	200	250	300	350
A-RF	in	11.5	13.0	14.0	17.0	20.0	22.0	26.0	31.0	33.0	35.0
	mm	292	330	356	432	508	559	660	787	838	889
A-BW	in	11.5	13.0	14.0	17.0	20.0	22.0	26.0	31.0	33.0	35.0
	mm	292	330	356	432	508	559	660	787	838	889
B	in	7.8	8.8	9.7	13.3	15.5	16.8	19.4	22.6	25.4	26.4
	mm	198	224	246	338	394	427	493	574	645	671
RF	lbs	65	90	115	215	348	481	926	1279	1722	2009
Wt.	kg	30	41	52	98	159	219	421	581	783	913
BW	lbs	51	68	91	161	255	349	762	1021	1411	1650
Wt.	kg	23	31	41	73	116	159	346	483	641	750

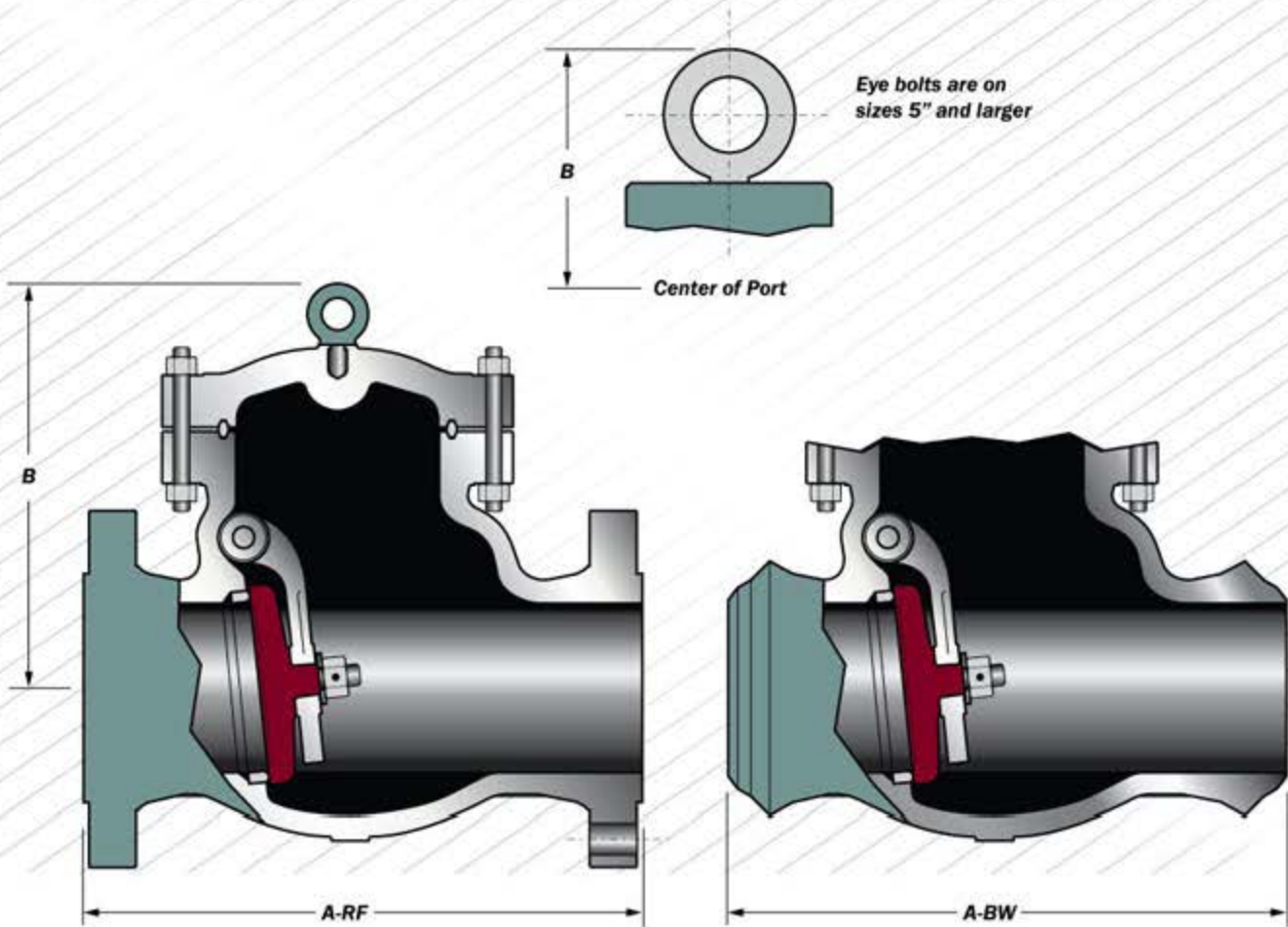
Note: Dimensions: Inches/Millimeters - Weights: Pounds/Kilograms. Larger sizes available on request. Dimensions are subject to change without notice.

AES Cast Carbon Steel Bolted Bonnet Valves
Product Line Technical Data

Cast Steel Bolted Cover Swing Checks
Class: 900 - Sizes: 2" thru 8"

Design and Manufacturing Standards

Valve Design	ASME B16.34/API 600
Flange Dimensions	ASME B16.5, B16.47
Face-to-Face Dimensions	ASME B16.10
Tested in Accordance with	API 598
Recommended Spare Parts*	



Typical Bill of Materials

Component	A11	A18	A22	Component	A11	A18	A22
Body	ASTM A216-WCB			Name Plate	304 Stainless Steel		
Cover	ASTM A105N			Washer	Stainless Steel		
Disc 2" thru 5"	ASTM A182-F6a	ASTM A182-F6a /HF	ASTM A182-F316	Cover Bolt	ASTM A193-B7		
Disc 6" and larger	ASTM A216-WCB /13% Chrome	ASTM A216-WCB/ HF	ASTM A216-WCB/ 316 Faced	Cover Nut	ASTM A276-410	ASTM A276-316	
Swing Arm	ASTM A216-WCB			Plug	AISI 1020		
Seat Ring	ASTM A105/HF			Pin	ASTM A276-316		
*Cover Gasket	Soft Steel Ring Joint			Hex Nut	A194-8		
Hinge Pin	ASTM A276-410		ASTM A276-316	Eye Bolt 5" thru 24"	Carbon Steel		

Class 900

Size	nps	2	3	4	6	8
	dn	50	75	100	150	200
A-RF	in	14.5	15.0	18.0	24.0	29.0
	mm	368	381	457	610	737
A-BW	in	14.5	15.0	18.0	24.0	29.0
	mm	368	381	457	610	737
B	in	13.1	14.8	14.5	18.8	23.6
	mm	329	329	368	478	599
RF	lbs	104	184	344	770	1482
	kg	47	84	156	350	674
BW	lbs	78	138	258	578	1112
	kg	35	63	129	263	505

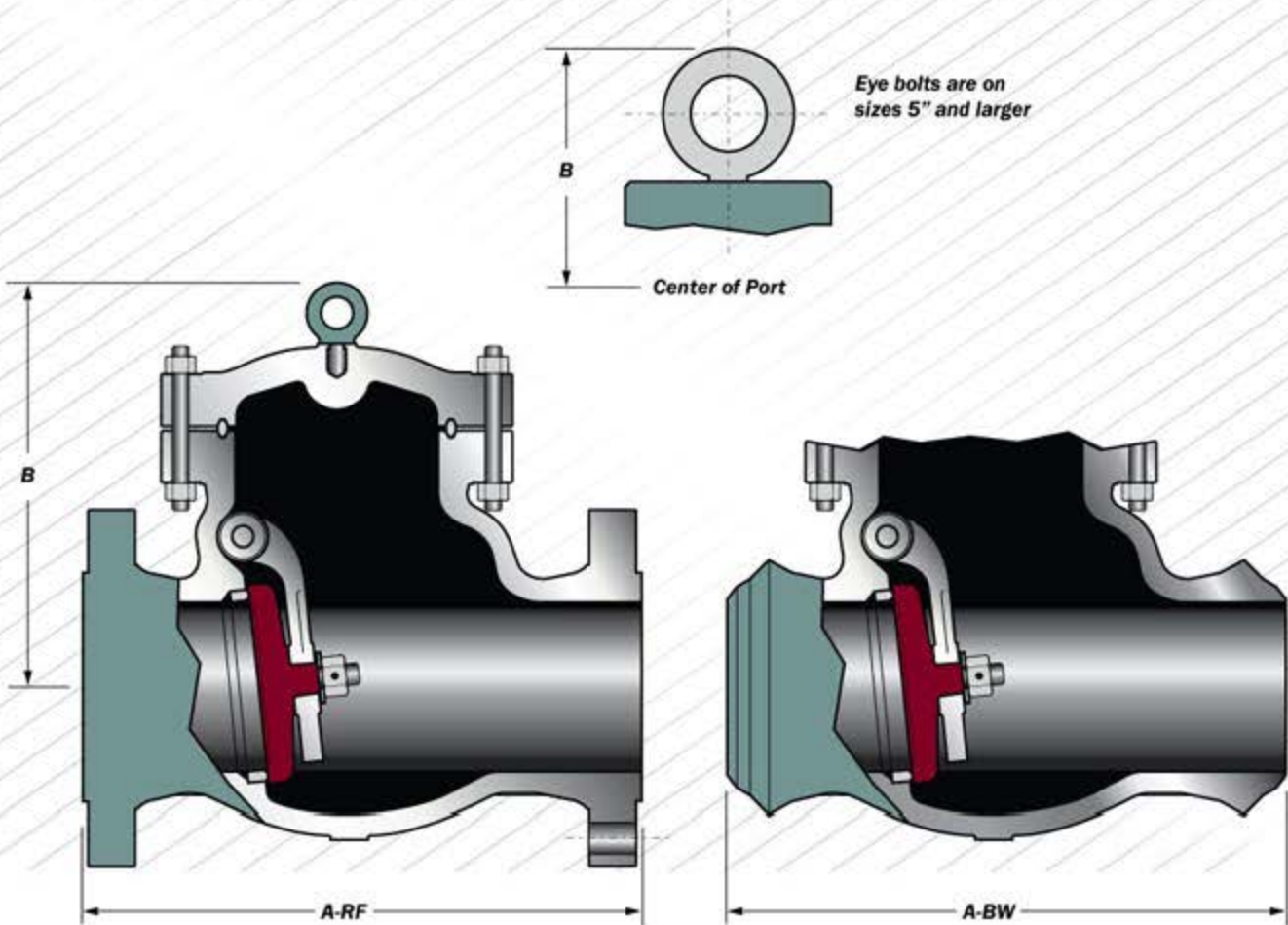
Note: Dimensions: Inches/Millimeters - Weights: Pounds/Kilograms. Larger sizes available on request. Dimensions are subject to change without notice.

AES Cast Carbon Steel Bolted Bonnet Valves
Product Line Technical Data

Cast Steel Bolted Cover Swing Checks
Class: 1500 - Sizes: 2" thru 8"

Design and Manufacturing Standards

Valve Design: ASME B16.34/API 600
Flange Dimensions: ASME B16.5, B16.47
Face-to-Face Dimensions: ASME B16.10
Tested in Accordance with: API 598
Recommended Spare Parts*



Typical Bill of Materials

Component	A11	A18	A22	Component	A11	A18	A22
Body	ASTM A216-WCB			Name Plate	304 Stainless Steel		
Cover	ASTM A105N			Washer	Stainless Steel		
Disc 2" thru 5"	ASTM A182-F6a	ASTM A182-F6a /HF	ASTM A182-F316	Cover Bolt	ASTM A193-B7		
Disc 6" and larger	ASTM A216-WCB /13% Chrome	ASTM A216-WCB/ HF	ASTM A216-WCB/ 316 Faced	Cover Nut	ASTM A276-410	ASTM A276-316	
Swing Arm	ASTM A216-WCB			Plug	AISI 1020		
Seat Ring	ASTM A105/HF			Pin	ASTM A276-316		
*Cover Gasket	Soft Steel Ring Joint			Hex Nut	A194-8		
Hinge Pin	ASTM A276-410		ASTM A276-316	Eye Bolt 5" thru 24"	Carbon Steel		

Class 1500

Size	nps	2	2.5	3	4	6	8
A-RF	dn	50	75	100	150	200	203
	in	14.5	16.5	18.5	21.5	27.8	32.8
	mm	368	419	470	546	706	833
A-BW	in	14.5	16.5	18.5	21.5	27.8	32.8
	mm	368	419	470	546	706	833
	B	in	13.1	13.7	14.8	15.2	19.2
RF	lbs	165	243	284	462	940	1030
	kg	75	110	129	269	427	468
BW	lbs	153	223	256	425	895	985
	kg	70	101	116	193	407	448

Note: Dimensions: Inches/Millimeters - Weights: Pounds/Kilograms. Larger sizes available on request. Dimensions are subject to change without notice.

TEST PROCEDURE

A.P.I. 598 TESTING FOR METAL SEATED GATE / GLOBE & CHECK VALVES



Serving Your Energy Needs

TABLE 1 – TEST PRESSURE (ASME B 16.34 & API Std. 602 for Class 800 Valves)

Class	150#			300#		
	Description	CWP	Shell	Seat	CWP	Shell
Material	psig	Kg/cm ²	Kg/cm ²	psig	Kg/cm ²	Kg/cm ²
A105, A350-LF2	285	32	23	740	80	59
A182-F5, F9, F11, F22	290	32	23	750	80	59
A182-F304, F316	275	30	23	720	78	57
A182-F304L, F316L	230	25	20	600	64	48
Class	600#			800#		
	Description	CWP	Shell	Seat	CWP	Shell
Material	psig	Kg/cm ²	Kg/cm ²	psig	Kg/cm ²	Kg/cm ²
A105, A350-LF2	1480	157	117	1975	210	153
A182-F5, F9, F11, F22	1500	159	117	2000	211	155
A182-F304, F316	1440	153	113	1920	204	150
A182-F304L, F316L	1200	127	94	1600	169	125
Class	1500#			2500#		
	Description	CWP	Shell	Seat	CWP	Shell
Material	psig	Kg/cm ²	Kg/cm ²	psig	Kg/cm ²	Kg/cm ²
A105, A350-LF2	3705	392	289	6170	653	478
A182-F5, F9, F11, F22	3750	396	291	6250	660	484
A182-F304, F316	3600	380	280	6000	633	465
A182-F304L, F316L	3000	317	233	5000	528	387

CWP: The maximum allowable pressure at - 20°F to 100°F (38°C).

TABLE 2 – TEST DURATION

NOMINAL SIZE (NPS)	MINIMUM TEST DURATIONS (Seconds)			
	Hydro Shell Test	Backseat Test	Hydro Seat Test	Air Seat Test
≤ 2"	15	15	15	15
2 ½" - 6"	60	60	60	60
8" - 12"	120	60	120	120
≥ 14"	300	60	120	120

TABLE 3 – MAXIMUM ALLOWABLE LEAKAGE RATES

NOMINAL SIZE (NPS)	Gate & Globe Valves		Check Valves	
	Liquid Test ^(a) (Drops Per Minute)	Gas Test (Bubbles Per Minute)	Liquid Test	Gas Test
≤ 2"	0 ^(b)	0 ^(c)	3 scc x NPS / minute.	700 scc x NPS / minute
2 ½" - 6"	12	24		
8" - 12"	20	40		
≥ 14"	d	e		

(a) For the liquid test, 1 millilitre is considered equivalent to 16 drops

(b) For the liquid test, 0 drops means no visible leakage per minimum specified duration of the test.

(c) For the gas test, 0 bubbles means less than 1 bubble per minimum specified duration of the test.

(d) For valves greater than or equal to 14" (NPS 14), the maximum permissible leakage rate shall be 2 drops per minute per inch NPS size.

(e) For valves greater than or equal to 14" (NPS 14), the maximum permissible leakage rate shall be 4 bubbles per minute per inch NPS size.

Cast Steel Bolted Cover Tilting Disc Check Valves

Sizes: 2" thru 12"

Pressure Class: 150 thru 300



Serving Your Energy Needs



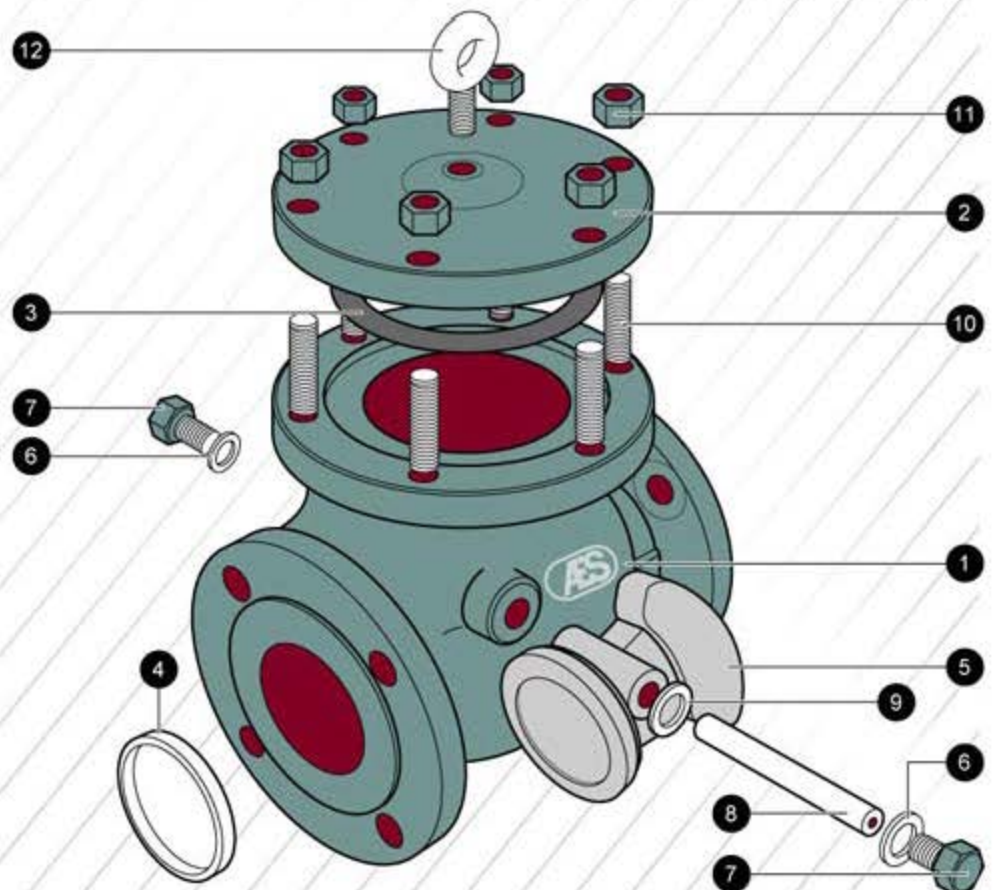


Serving Your Energy Needs

Typical AES Cast Steel Bolted Cover Tilting Disc Check Valve Expanded View

Note: Classes 600 & larger uses internal hinge pin

- 1. Body:** AES cast steel bodies provide low flow resistance and optimum strength and performance.
- 2. Cover:** The cover allows access to internal components.
- 3. Cover Gasket:** The cover gasket creates a leak-proof seal between the cover and body.
- 4. Seat Ring:** To ensure a stable shutoff, the seat ring is aligned into the valve, then precision ground for optimal seating.
- 5. Disc:** The disc allows uni-directional flow and restricts back flow.
- 6. Plug Gasket:** The plug gasket creates a leak-proof seal between the plug and body.
- 7. Plug:** The plug nut and pin secures the disc to the arm.
- 8. Hinge Pin:** The hinge pin provides a stable mechanism for the disc to operate.
- 9. Hinge Pin Washer:** The hinge pin washer provides accurate disc positioning.
- 10. & 11. Cover Studs & Nuts:** The cover studs and nuts secure the bonnet to the body.
- 12. Eyebolt:** The eyebolt is use to aid in lifting the valve.

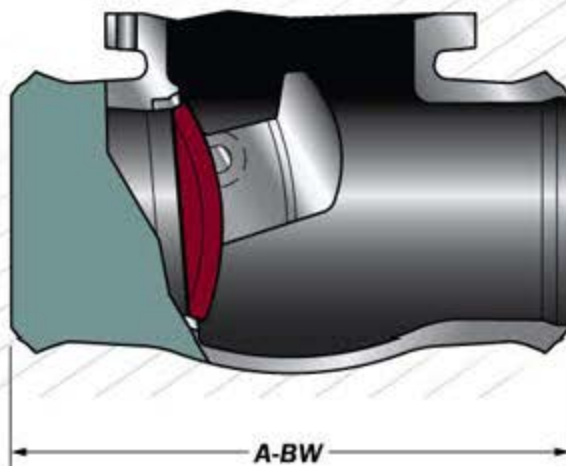
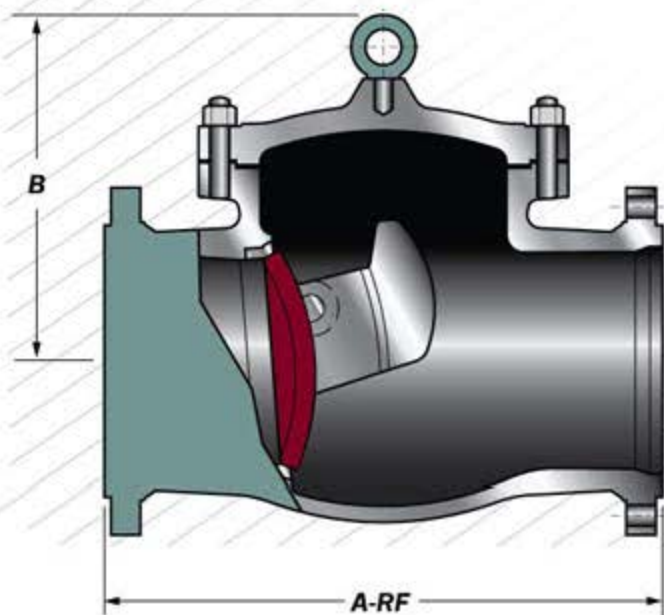
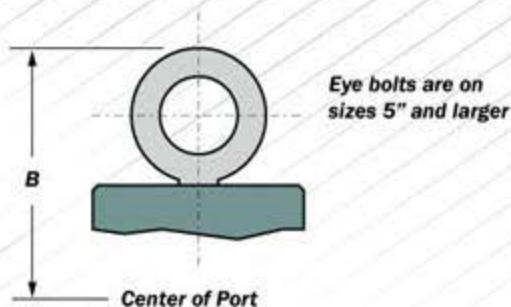


AES Cast Carbon Steel Bolted Bonnet Valves
Product Line Technical Data

Cast Steel Bolted Cover Tilting Disc Check
Class: 150 - Sizes: 2" thru 12"

Design and Manufacturing Standards

Valve Design: ASME B16.34/API 600
Flange Dimensions: ASME B16.5, B16.47
Face-to-Face Dimensions: ASME B16.10
Tested in Accordance with: API 598
Recommended Spare Parts*



Typical Bill of Materials

Component	A11	A18	A22	Component	A11	A18	A22
Body	ASTM A216-WCB			Hinge Pin	ASTM A479-410		
Cover	ASTM A105/A216-WCB			Hinge Pin Washer	ASTM A479-410		
Disc	ASTM A216-WCB/ 13% Chrome	ASTM A216-WCB/ HF	CS-316	Plug Gasket	304 Stainless Steel/Graphite		
				Name Plate	304 Stainless Steel		
Seat Ring	ASTM A105/HF		ASTM A182-F316/ ASTM A351-CF8M w/HF	Cover Bolts	ASTM A193-B7		
				Cover Nuts	ASTM A194-2H		
				Plug	ASTM A105		
*Cover Gasket	Spiral Wound 304 Stainless Steel/Graphite			Eye Bolt 5" & larger	ASTM A108-1020		

Class 150

Size	nps	2.5	3	4	6	8	10	12
A-RF	dn	65	75	100	150	200	250	300
	in	8.5	9.5	11.5	14.0	19.5	24.5	27.5
A-BW	mm	216	241	292	356	495	622	699
	in	8.5	9.5	11.5	14.0	19.5	24.5	27.5
B	mm	210	190	185	230	350	390	410
	in	8.27	7.5	7.3	9.0	13.8	15.4	16.1
RF	lbs	42	68	92	174	302	477	655
Wt.	kg	92	150	202	383	664	1049	1441
	lbs	30	50	78	136	244	376	464
BW	kg	66	110	172	299	537	827	1021

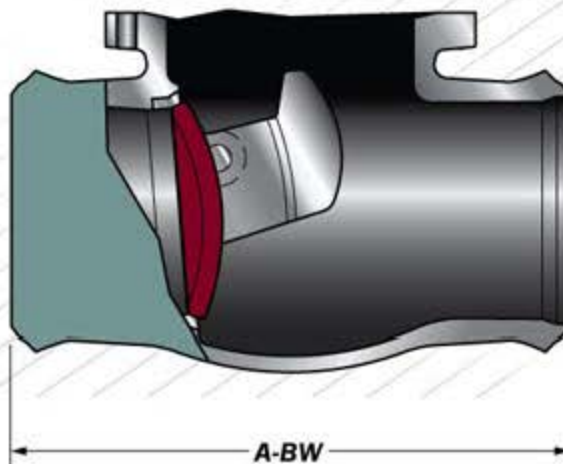
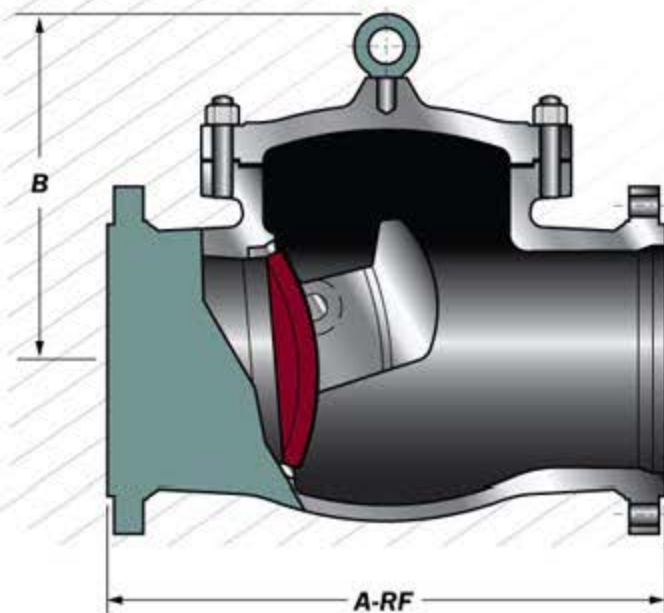
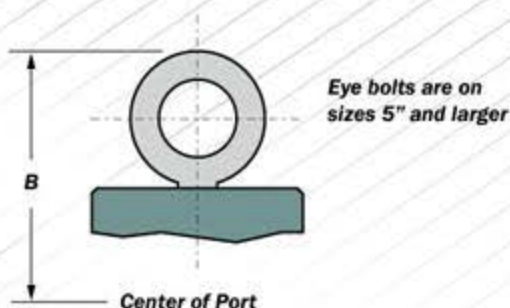
Note: Dimensions: Inches/Millimeters - Weights: Pounds/Kilograms. Larger sizes available on request. Dimensions are subject to change without notice.

AES Cast Carbon Steel Bolted Bonnet Valves
Product Line Technical Data

Cast Steel Bolted Cover Tilting Disc Check
Class: 300 - Sizes: 3" thru 12"

Design and Manufacturing Standards

Valve Design: ASME B16.34/API 600
Flange Dimensions: ASME B16.5, B16.47
Face-to-Face Dimensions: ASME B16.10
Tested in Accordance with: API 598
Recommended Spare Parts*



Typical Bill of Materials

Component	A11	A18	A22	Component	A11	A18	A22
Body	ASTM A216-WCB			Hinge Pin	ASTM A479-410		
Cover	ASTM A105/A216-WCB			Hinge Pin Washer	ASTM A479-410		
Disc	ASTM A216-WCB/ 13% Chrome	ASTM A216-WCB/ HF	CS-316	Plug Gasket	304 Stainless Steel/Graphite		
				Name Plate	304 Stainless Steel		
Seat Ring	ASTM A105/HF		ASTM A182-F316/ ASTM A351-CF8M w/HF	Cover Bolts	ASTM A193-B7		
				Cover Nuts	ASTM A194-2H		
				Plug	ASTM A105		
*Cover Gasket	Spiral Wound 304 Stainless Steel/Graphite			Eye Bolt 5" & larger	ASTM A108-1020		

Class 300

Size	nps	3	4	6	8	10	12
A-RF	dn	75	100	150	200	250	300
	in	12.5	14.0	17.5	21.0	24.5	28.0
A-BW	mm	318	356	444	533	622	711
	in	12.5	14.0	17.5	21.0	24.5	28.0
B	mm	318	356	444	533	622	711
	in	6.5	7.3	8.8	13.4	15.2	17.7
RF	lbs	165	185	224	340	385	450
	kg	82	122	252	386	568	818
BW	lbs	180	268	554	849	1250	1800
	kg	57	78	168	278	458	690
Wt.	lbs	125	172	370	612	1008	1518
	kg						

Note: Dimensions: Inches/Millimeters - Weights: Pounds/Kilograms. Larger sizes available on request. Dimensions are subject to change without notice.

Cast Steel Bolted Bonnet Stop Check Valves

Sizes: 2" thru 14"

Pressure Class: 150 thru 1500



Serving Your Energy Needs

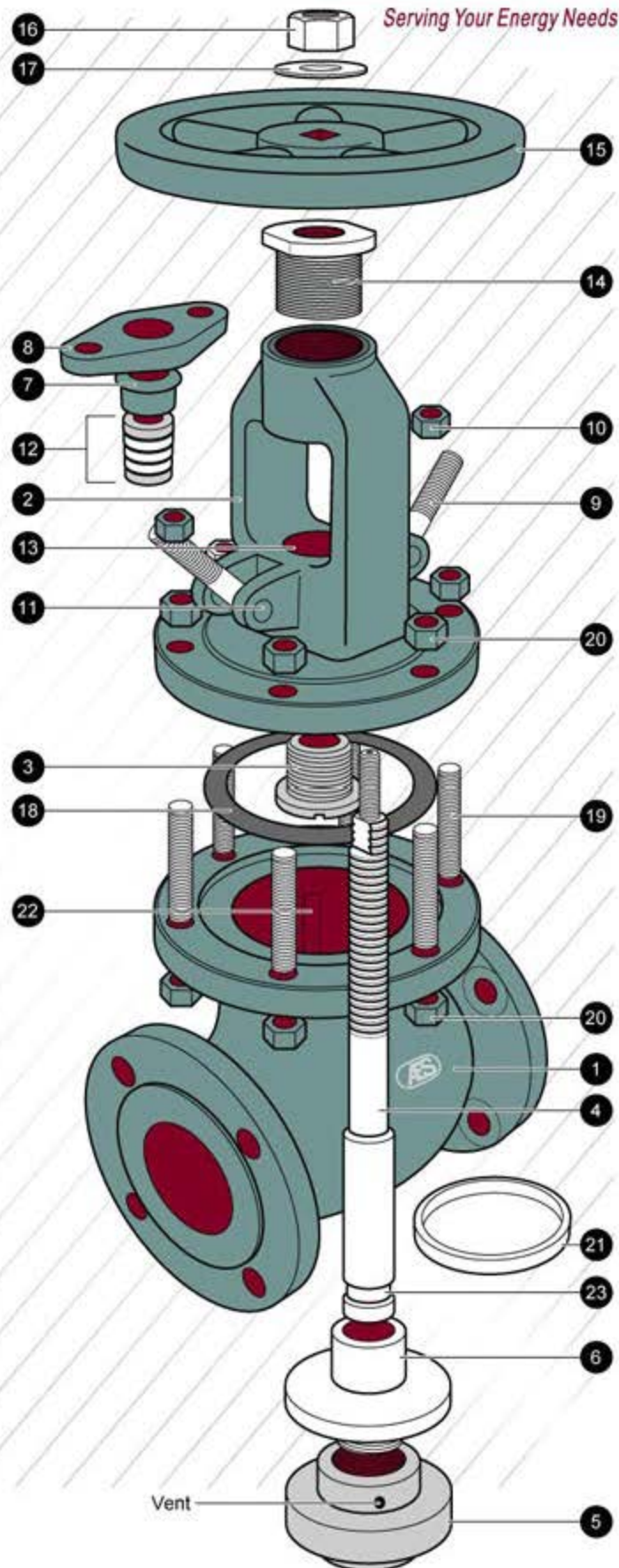




Serving Your Energy Needs

Typical AES Cast Steel Bolted Bonnet Stop Check Valve Expanded View

1. **Body:** AES cast steel bodies provide low flow resistance and optimum strength and performance.
2. **Bonnet:** AES bonnet assemblies are built to the same standards as the bodies.
3. **Back Seat:** The back seat, when engaged with the stem head, provides a stable shutoff to the stuffing box which isolates the packing from flow exposure.
4. **Stem:** The stem inserts vertically into the disc.
5. **Disc:** AES 1-piece vented disc is machined to the tightest tolerances to ensure trouble free shutoff and cycling.
6. **Disc Nut:** The disc nut serves as a mechanical guide acting on the stem to ensure proper alignment of the disc to the seat.
7. **Gland:** Compresses the packing to create a stem seal above the back seat, between the bonnet and stem.
8. **Gland Flange:** Applies pressure to the gland for accurate packing adjustments.
9. & 10. **Gland Bolts & Nuts:** The gland bolt and nut allows for easy adjustments for packing compression.
11. **Gland Bolt Pin:** The gland bolt pin secures the gland bolts to the yoke & bonnet.
12. **Packing:** The packing creates a seal above the back seat, between the bonnet and stem.
13. **Stuffing Box:** The stuffing box contains the packing.
14. **Stem Nut:** The stem nut provides a precision guide for proper stem alignment.
15. **Handwheel:** The handwheel cycles the valve.
16. **Handwheel Nut:** The handwheel nut secures the handwheel to the bonnet assembly.
17. **Handwheel Washer:** The washer helps to prevent loosening or distributes pressure evenly.
18. **Bonnet Gasket:** The bonnet gasket creates a leakproof seal between the bonnet and body.
19. & 20. **Bonnet Studs & Nuts:** The bonnet studs and nuts secure the bonnet to the body.
21. **Seat Ring:** To ensure a stable shutoff, the seat ring is aligned and seal-welded into the valve, then precision ground for optimal seating.
22. **Disc Guide:** The disc guides provide a stable track for keeping the disc aligned with the seat during cycling.
23. **Lock Groove:** The lock groove receives the split lock ring which allows the disc nut to lift the disc during cycling.



AES Cast Carbon Steel Bolted Bonnet Valves

Product Line Technical Data

Cast Steel Bolted Cover Stop Checks

Class: 150 - Sizes: 2" thru 14"

Design and Manufacturing Standards

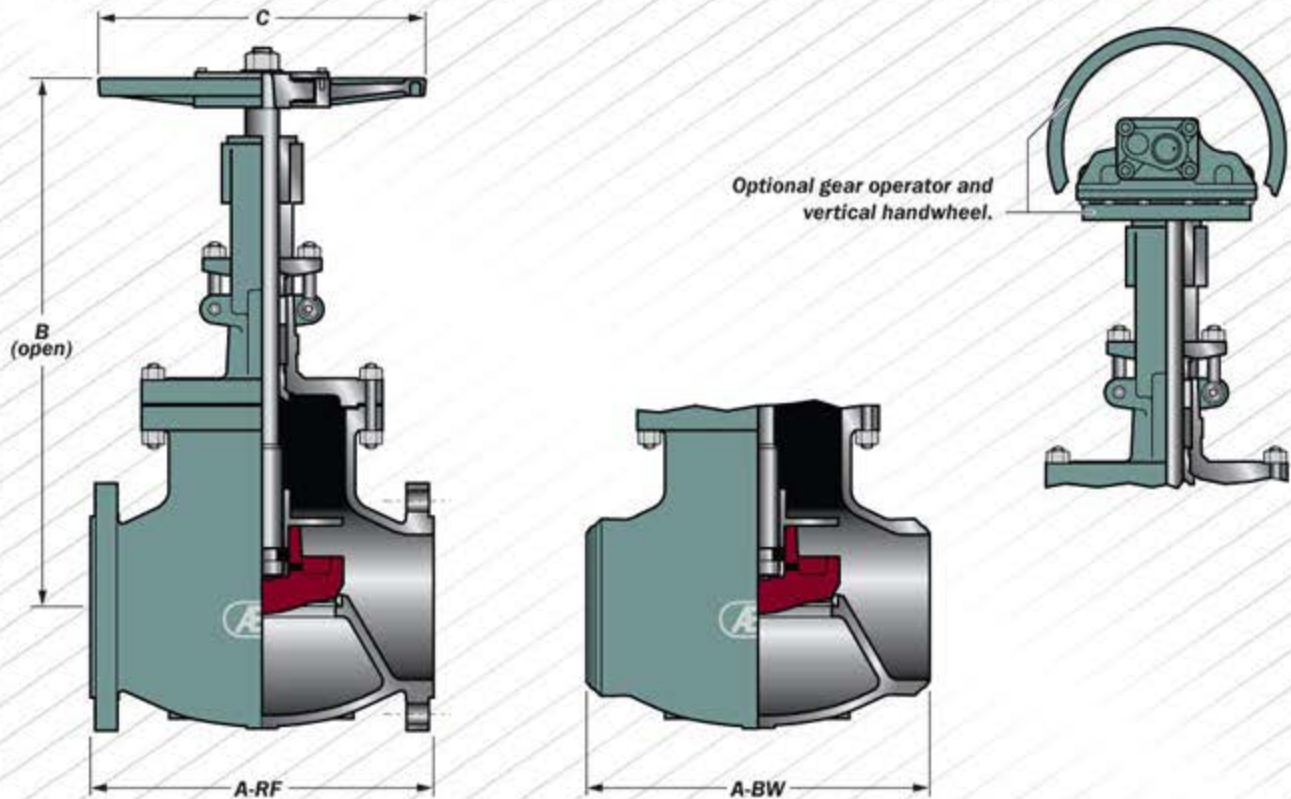
Valve Design: ASME B16.34/API 600

Flange Dimensions: ASME B16.5, B16.47

Face-to-Face Dimensions: ASME B16.10

Tested in Accordance with: API 598

Recommended Spare Parts*



Typical Bill of Materials

Component	A11	A18	A22	Component	A11	A18	A22
Body	ASTM A216-WCB			Gland Bolt Pins	ASTM A36		
Disc 2" thru 4"	ASTM A276-410	ASTM A216-WCB/ HF	ASTM A276-316	Gland Nuts	ASTM A194-2H		
Disc 5" and larger	ASTM A216-WCB/ 13% Chrome		ASTM A216- WCB/316	Gland Bolts	ASTM A307-B		
Stem	ASTM A276-410		ASTM A276-316	Seat Ring	ASTM A105/HF**		
Bonnet	ASTM A216-WCB			Split Ring	N/A		
*Bonnet Gasket	Spiral Wound 316 Stainless Steel/Graphite			Nameplate	ASTM A666-304		
Bonnet Nuts	ASTM A194-2H			Nameplate Rivets	Commercial		
Bonnet Studs	ASTM 193-B7			Disc Nut	ASTM A276-410	ASTM A276-316	
Back Seat Bushing	ASTM A276-410	ASTM A276-316		Stem Nut	ASTM A439-D2		
*Packing	Graphite W/Braided Carbon Fiber End Rings			Handwheel Washer	ASTM A36		
Gland	ASTM A276-410	ASTM A276-316		Handwheel Nut	ASTM A36		
Gland Flange	ASTM A276-WCB			Handwheel	ASTM A536 (65-45-12)		
				Spacer Ring	N/A		

Class 150

Size	nps	2	2.5	3	4	5	6	8	10	12	14
	dn	50	75	100	150	125	150	200	250	300	350
A-RF	in	8.0	8.5	9.5	11.5	14.0	16.0	19.5	24.5	27.5	31.0
	mm	203	216	241	292	356	406	495	622	699	787
A-BW	in	8.0	8.5	9.5	11.5	14.0	16.0	19.5	24.5	27.5	31.0
	mm	203	216	241	292	356	406	495	622	699	787
B	in	14.9	15.8	16.6	19.9	21.8	22.4	26.5	30.6	34.8	41.4
	mm	378	401	422	505	554	569	673	777	884	1052
C	in	8.0	10.0	10.0	12.0	14.0	16.0	18.0	22.0	24.0	25.2
	mm	203	254	254	305	356	406	457	559	610	640
RF	lbs	51	73	93	137	192	243	419	507	948	1276
	kg	23	33	42	62	87	110	190	276	476	625
BW	lbs	51	73	93	137	192	243	419	507	948	1276
	kg	23	33	42	62	87	110	190	276	476	625

Note: Dimensions: Inches/Millimeters - Weights: Pounds/Kilograms. Larger sizes available on request. Dimensions are subject to change without notice.

** Integral seat w/HF for sizes 2" to 4".

AES Cast Carbon Steel Bolted Bonnet Valves

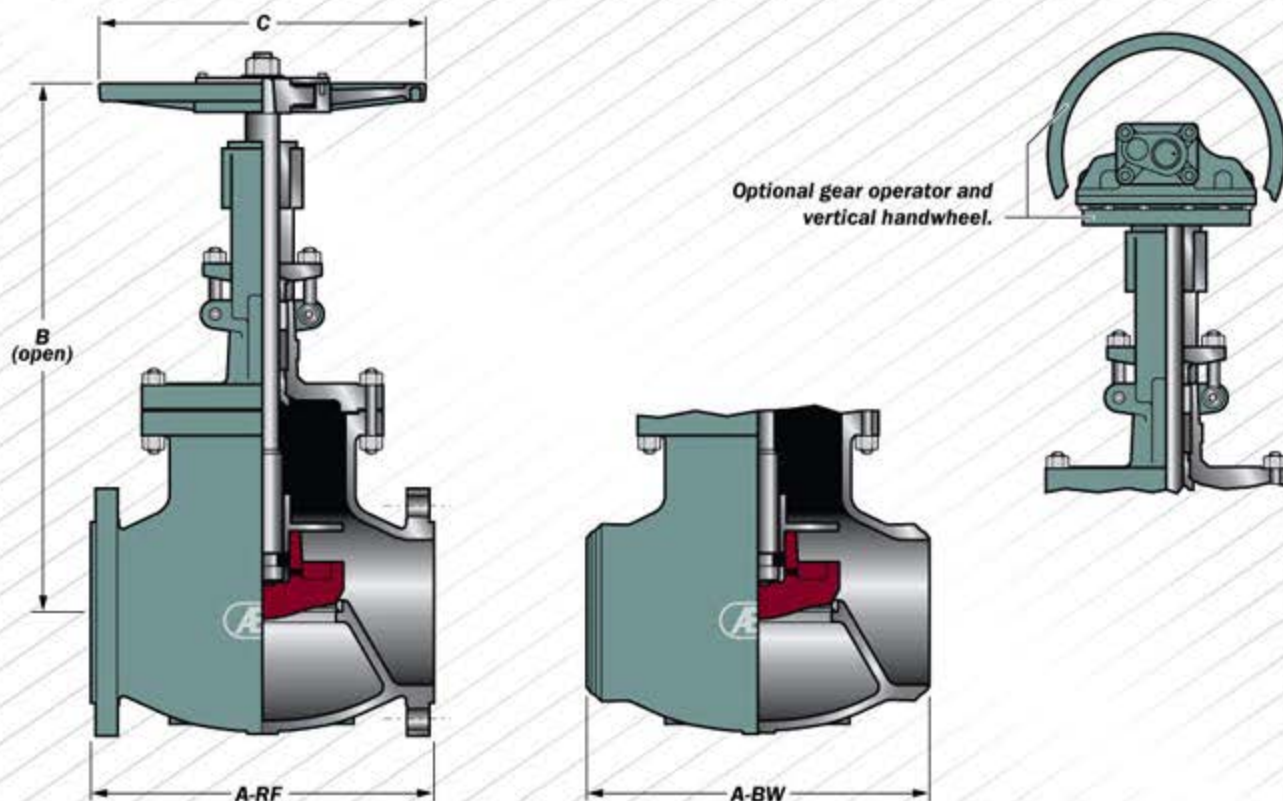
Product Line Technical Data

Cast Steel Bolted Cover Stop Checks

Class: 300 - Sizes: 2" thru 14"

Design and Manufacturing Standards

Valve Design: ASME B16.34/API 600
Flange Dimensions: ASME B16.5, B16.47
Face-to-Face Dimensions: ASME B16.10
Tested in Accordance with: API 598
Recommended Spare Parts*



Typical Bill of Materials

Component	A11	A18	A22	Component	A11	A18	A22
Body	ASTM A216-WCB			Gland Bolt Pins	ASTM A36		
Disc 2" thru 4"	ASTM A276-410	ASTM A216-WCB/ HF	ASTM A276-316	Gland Nuts	ASTM A194-2H		
Disc 5" and larger	ASTM A216-WCB/ 13% Chrome			ASTM A216- WCB/316	Gland Bolts	ASTM A307-B	
Stem	ASTM A276-410		ASTM A276-316	Seat Ring	ASTM A105/HF**		
Bonnet	ASTM A216-WCB			Split Ring	N/A		
*Bonnet Gasket	Spiral Wound 316 Stainless Steel/Graphite			Nameplate	ASTM A666-304		
Bonnet Nuts	ASTM A194-2H			Nameplate Rivets	Commercial		
Bonnet Studs	ASTM 193-B7			Disc Nut	ASTM A276-410	ASTM A276-316	
Back Seat Bushing	ASTM A276-410	ASTM A276-316		Stem Nut	ASTM A439-D2		
*Packing	Graphite W/Braided Carbon Fiber End Rings			Handwheel Washer	ASTM A36		
Gland	ASTM A276-410	ASTM A276-316		Handwheel Nut	ASTM A36		
Gland Flange	ASTM A276-WCB			Handwheel	ASTM A536 (65-45-12)		
				Spacer Ring	N/A		

Class 300

Size	nps	2	2.5	3	4	5	6	8	10	12	14
	dn	50	75	100	150	125	150	200	250	300	350
A-RF	in	10.5	11.5	12.5	14.0	15.75	17.5	22.0	24.5	28.0	33.0
	mm	267	292	318	357	400	445	559	622	711	838
A-BW	in	10.5	11.5	12.5	14.0	15.75	17.5	22.0	24.5	28.0	33.0
	mm	267	292	318	357	400	445	559	622	711	838
B	in	16.9	17.8	19.2	23.0	27.4	30.6	36.2	40.8	47.3	54.3
	mm	429	452	488	584	696	777	919	1036	1201	1379
C	in	10.0	10.0	12.0	14.0	14.0	18.0	24.0	24.0	27.0	28.3
	mm	254	254	305	356	406	457	610	610	686	720
RF	lbs	75.0	100.0	130.0	203.0	294.0	421.0	715	1015	1500	2446
Wt.	kg	34	45	59	92	134	191	325	461	682	1112
BW	lbs	55	79	101	163	242	355	566	770	1218	1996
Wt.	kg	25	36	46	74	110	161	257	350	554	907

Note: Dimensions: Inches/Millimeters - Weights: Pounds/Kilograms. Larger sizes available on request. Dimensions are subject to change without notice.

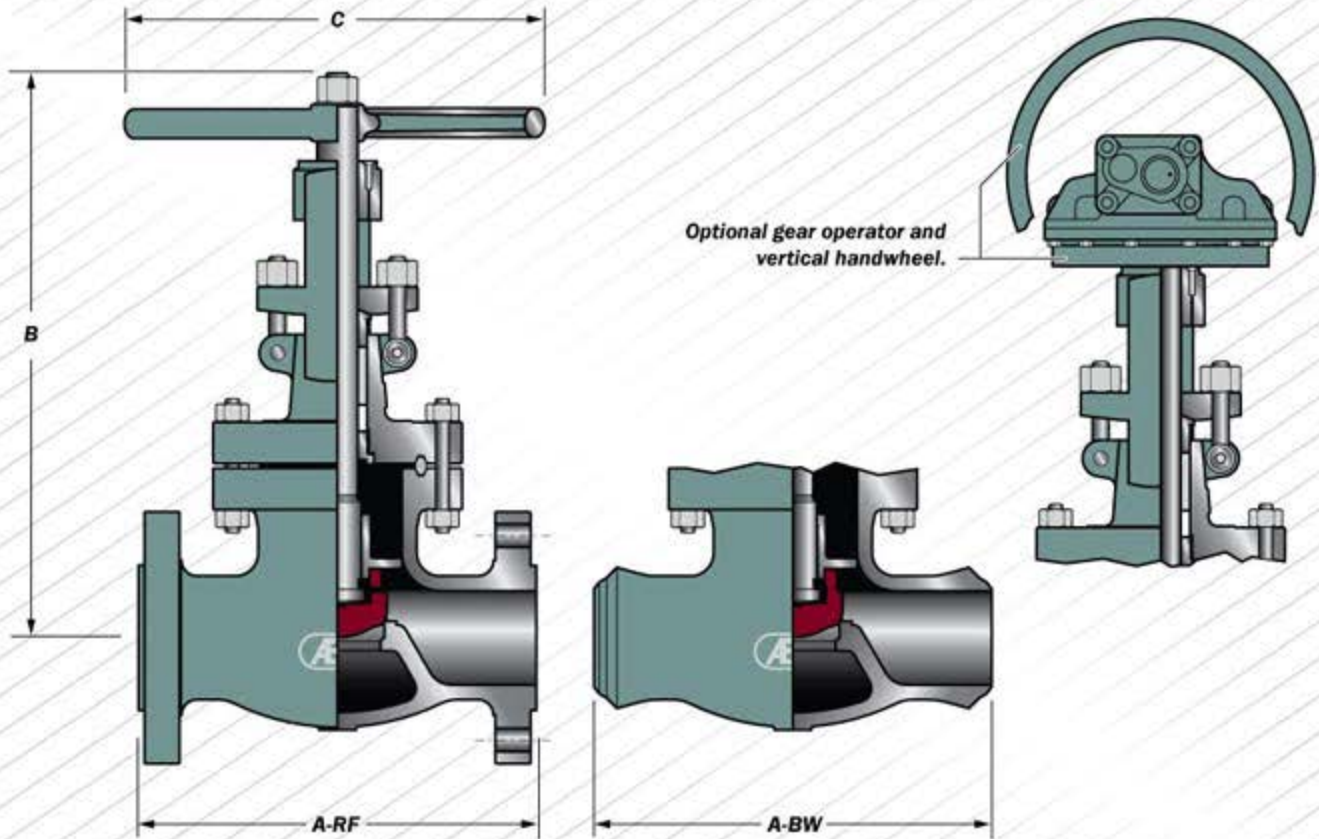
** Integral seat w/HF for sizes 2" to 4".

AES Cast Carbon Steel Bolted Bonnet Valves
 Product Line Technical Data

Cast Steel Bolted Cover Stop Checks
 Class: 600 - Sizes: 2" thru 8"

Design and Manufacturing Standards

Valve Design: ASME B16.34/API 600
Flange Dimensions: ASME B16.5, B16.47
Face-to-Face Dimensions: ASME B16.10
Tested in Accordance with: API 598
Recommended Spare Parts*



Typical Bill of Materials

Component	A11	A18	A22	Component	A11	A18	A22
Body		ASTM A216-WCB		Gland Bolt Pins		ASTM A36	
Disc 2" thru 4"	ASTM A276-410	ASTM A216-WCB/ HF	ASTM A276-316	Gland Nuts		ASTM A194-2H	
Disc 5" and larger	ASTM A216-WCB/ 13% Chrome			ASTM A216- WCB/316	Gland Bolts		ASTM A307-B
Stem	ASTM A276-410		ASTM A276-316	Seat Ring		Integral ASTM A216 WCB/HF	
Bonnet	ASTM A216-WCB			Split Ring		N/A	
*Bonnet Gasket	Soft Steel Ring Joint			Nameplate		ASTM A666-304	
Bonnet Nuts	ASTM A194-2H			Nameplate Rivets		Commercial	
Bonnet Studs	ASTM 193-B7			Disc Nut	ASTM A276-410		ASTM A276-316
Back Seat Bushing	ASTM A276-410		ASTM A276-316	Stem Nut		ASTM A439-D2	
*Packing	Graphite W/Braided Carbon Fiber End Rings			Handwheel Washer		ASTM A36	
Gland	ASTM A276-410		ASTM A276-316	Handwheel Nut		ASTM A36	
Gland Flange	ASTM A276-WCB			Handwheel		ASTM A536 (65-45-12)	
				Spacer Ring		ASTM A276-410	

Class 600

Size	nps	2	2.5	3	4	6	8
	dn	50	75	100	150	200	203
A-RF	in	11.5	13.0	14.0	17.0	22.0	26.0
	mm	292	325	256	435	559	660
A-BW	in	11.5	13.0	14.0	17.0	22.0	26.0
	mm	292	325	256	435	559	660
B	in	18.4	20.0	24.4	29.0	37.9	44.7
	mm	467	508	620	737	963	1135
C	in	10.0	10.0	14.0	18.0	24.0	24.0
	mm	254	254	356	457	610	610
RF	lbs	90	130	170	313	778	1245
Wt.	kg	41	59	77	142	354	566
BW	lbs	79	110	141	256	640	961
WL	kg	36	50	64	116	291	437

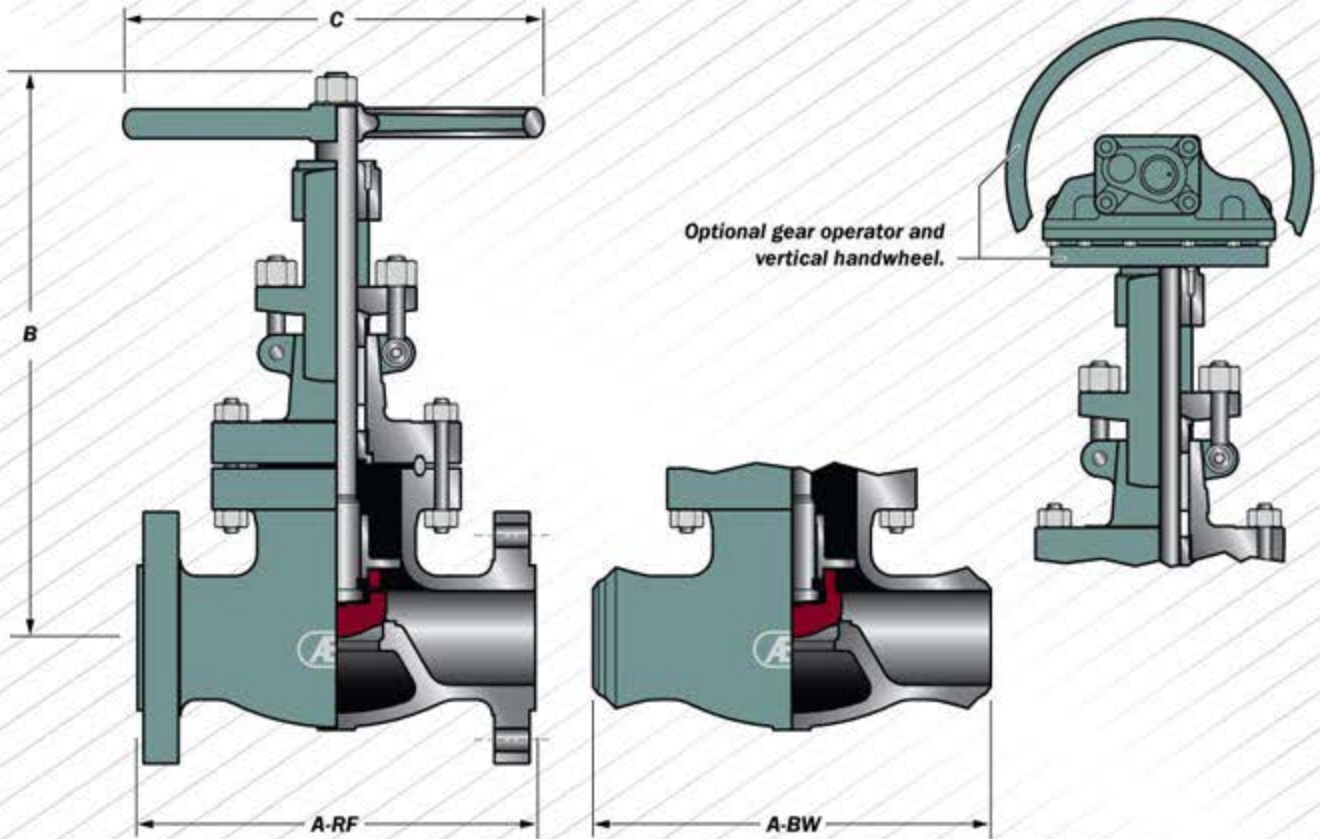
Note: Dimensions: Inches/Millimeters - Weights: Pounds/Kilograms. Larger sizes available on request. Dimensions are subject to change without notice.

AES Cast Carbon Steel Bolted Bonnet Valves
Product Line Technical Data

Cast Steel Bolted Cover Stop Checks
Class: 900 - Sizes: 2" thru 8"

Design and Manufacturing Standards

Valve Design: ASME B16.34/API 600
Flange Dimensions: ASME B16.5, B16.47
Face-to-Face Dimensions: ASME B16.10
Tested in Accordance with: API 598
Recommended Spare Parts*



Typical Bill of Materials

Component	A11	A18	A22	Component	A11	A18	A22
Body	ASTM A216-WCB			Gland Bolt Pins	ASTM A36		
Disc 2" thru 4"	ASTM A276-410	ASTM A216-WCB/		Gland Nuts	ASTM A194-2H		
Disc 5" and larger	ASTM A216-WCB/ 13% Chrome	HF	ASTM A216- WCB/316	Gland Bolts	ASTM A307-B		
Stem	ASTM A276-410		ASTM A276-316	Seat Ring	Integral ASTM A216 WCB/HF		
Bonnet	ASTM A216-WCB			Split Ring	N/A		
*Bonnet Gasket	Soft Steel Ring Joint			Nameplate	ASTM A666-304		
Bonnet Nuts	ASTM A194-2H			Nameplate Rivets	Commercial		
Bonnet Studs	ASTM 193-B7			Disc Nut	ASTM A276-410	ASTM A276-316	
Back Seat Bushing	ASTM A276-410	ASTM A276-316		Stem Nut	ASTM A439-D2		
*Packing	Graphite W/Braided Carbon Fiber End Rings			Handwheel Washer	ASTM A36		
Gland	ASTM A276-410	ASTM A276-316		Handwheel Nut	ASTM A36		
Gland Flange	ASTM A276-WCB			Handwheel	ASTM A536 (65-45-12)		
				Spacer Ring	ASTM A276-410		

Class 900

Size	nps	2	3	4	6	8
	dn	50	75	100	150	200
A-RF	in	14.5	15.0	18.0	24.0	29.0
	mm	368	381	457	610	737
A-BW	in	14.5	15.0	18.0	24.0	29.0
	mm	368	381	457	610	737
B	in	22.6	26.0	30.6	39.6	60.1
	mm	574	660	777	1006	1527
C	in	13.8	17.7	17.7	22.0	28.3
	mm	350	450	450	560	720
RF	lbs	198	335	440	1675	2090
Wt.	kg	90	152	200	761	950
BW	lbs	176	297	376	1144	1634
Wt.	kg	80	135	171	520	743

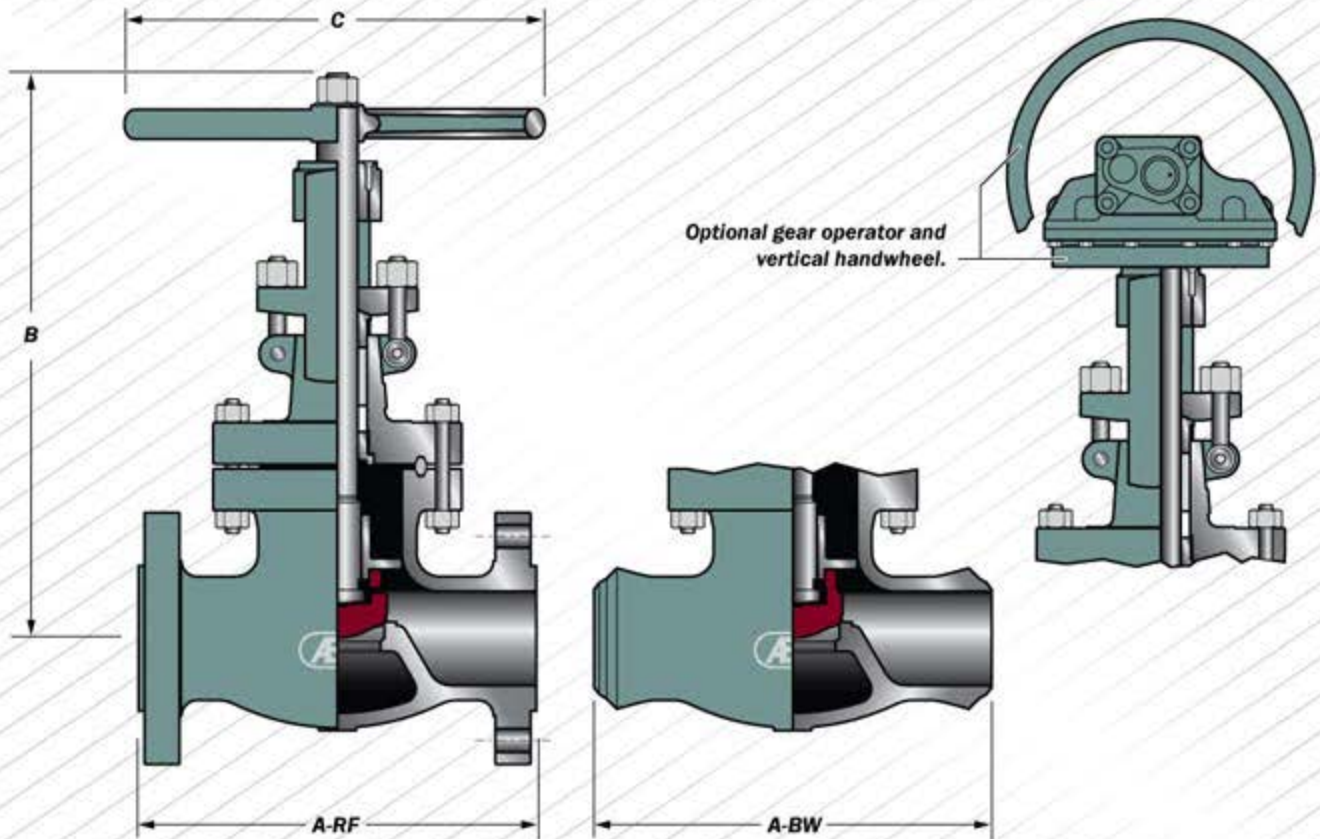
Note: Dimensions: Inches/Millimeters - Weights: Pounds/Kilograms. Larger sizes available on request. Dimensions are subject to change without notice.

AES Cast Carbon Steel Bolted Bonnet Valves
 Product Line Technical Data

Cast Steel Bolted Cover Stop Checks
 Class: 1500 - Sizes: 2" thru 8"

Design and Manufacturing Standards

Valve Design	ASME B16.34/API 600
Flange Dimensions	ASME B16.5, B16.47 (Series A)
Face-to-Face Dimensions	ASME B16.10
Tested in Accordance with:	API 598
Recommended Spare Parts*	



Typical Bill of Materials

Component	A11	A18	A22	Component	A11	A22	A22
Body		ASTM A216-WCB		Gland Bolt Pins		ASTM A36	
Disc 2" thru 4"	ASTM A276-410		ASTM A276-316	Gland Nuts		ASTM A194-2H	
Disc 5" and larger	ASTM A216-WCB/ 13% Chrome	ASTM A216-WCB/ HF	ASTM A216- WCB/316	Gland Bolts		ASTM A307-B	
Stem	ASTM A276-410		ASTM A276-316	Seat Ring		Integral ASTM A216 WCB/HF	
Bonnet	ASTM A216-WCB			Split Ring		N/A	
*Bonnet Gasket	Soft Steel Ring Joint			Nameplate		ASTM A666-304	
Bonnet Nuts	ASTM A194-2H			Nameplate Rivets		Commercial	
Bonnet Studs	ASTM 193-B7			Disc Nut	ASTM A276-410		ASTM A276-316
Back Seat Bushing	ASTM A276-410		ASTM A276-316	Stem Nut		ASTM A439-D2	
*Packing	Graphite W/Braided Carbon Fiber End Rings			Handwheel Washer		ASTM A36	
Gland	ASTM A276-410		ASTM A276-316	Handwheel Nut		ASTM A36	
Gland Flange	ASTM A276-WCB			Handwheel		ASTM A536 (65-45-12)	
				Spacer Ring		ASTM A276-410	

Class 1500

Size	nps	2	3	4	6
	dn	50	75	100	150
A-RF	in	14.5	18.5	21.5	27.75
	mm	368	470	546	705
A-BW	in	14.5	18.5	21.5	27.75
	mm	368	470	546	705
B	in	19.6	25.6	30.8	36.5
	mm	498	650	782	927
C	in	13.8	17.7	19.7	25.2
	mm	350	450	500	640
RF	lbs	209	551	959	1191
Wt.	kg	95	250	436	541
BW	lbs	143	460	830	996
Wt.	kg	65	209	377	453

Note: Dimensions: Inches/Millimeters - Weights: Pounds/Kilograms. Larger sizes available on request. Dimensions are subject to change without notice.



A world leader
in industrial valve manufacturing

FIELD SERVICES

Actuation Adaption

Alignments

Assignments

Cold Weather Treatment

Design of Special Tooling

Diagnostic Evaluations

Education

Experts Witness

Emission Containment

Engineering Services

Fitting

Foresnic Examination/Investigation

Gear Adaption

Hot Tap Modifications

Hydraulic Field Testing

Infield Coatings

Inhouse Testing

Inline Service Repairs

Inspection

Lapping Services

Leak Detection

Live Load Systems

Lubrication

Maintenance Machining

Maintenance Programs

Mill Wright Services

Negotiations

Oil Field Services

Oversite

Repairs

Start-up Oversite

Storage & Warehousing

Stress Analysis

Technical Seminars

Trouble Shooting

Up-Grades

Valve Inspections

Valve Sevcing

Welding

Cast Steel Bolted Bonnet Angle Stop Check Valves

Sizes: 2" thru 12"

Pressure Class: 150 thru 600



Serving Your Energy Needs

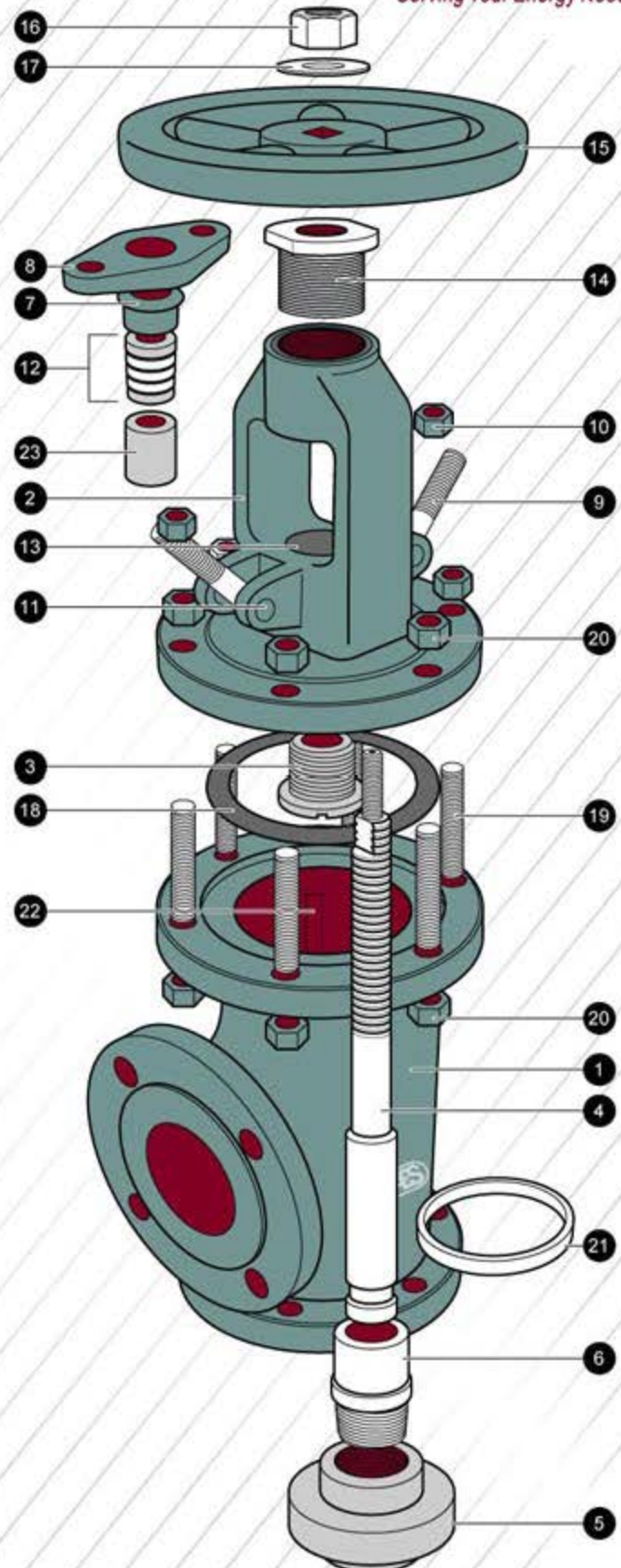




Serving Your Energy Needs

Typical AES Cast Steel Bolted Bonnet Angle Stop Check Valve Expanded View

- 1. Body:** AES cast steel bodies provide low flow resistance and optimum strength and performance.
- 2. Bonnet:** AES bonnet assemblies are built to the same standards as the bodies.
- 3. Back Seat Bushing:** The back seat, when engaged with the stem head, provides a stable shutoff to the stuffing box which isolates the packing from flow exposure.
- 4. Stem:** The stem inserts vertically into the disc.
- 5. Disc:** AES 1-piece disc is machined to the tightest tolerances to ensure trouble free shutoff and cycling.
- 6. Disc Nut:** The disc nut serves as a mechanical guide acting on the stem to ensure proper alignment of the disc to the seat.
- 7. Gland:** Compresses the packing to create a stem seal above the back seat, between the bonnet and stem.
- 8. Gland Flange:** Applies pressure to the gland for accurate packing adjustments.
- 9. & 10. Gland Bolts & Nuts:** The gland bolt and nut allows for easy adjustments for packing compression.
- 11. Gland Bolt Pin:** The gland bolt pin secures the gland bolts to the yoke & bonnet.
- 12. Packing:** The packing creates a seal above the back seat, between the bonnet and stem.
- 13. Stuffing Box:** The stuffing box contains the packing.
- 14. Stem Nut:** The stem nut provides a precision guide for proper stem alignment.
- 15. Handwheel:** The handwheel cycles the valve.
- 16. Handwheel Nut:** The handwheel nut secures the handwheel to the bonnet assembly.
- 17. Handwheel Washer:** The washer helps to prevent loosening or distributes pressure evenly.
- 18. Bonnet Gasket:** The bonnet gasket creates a leakproof seal between the bonnet and body.
- 19. & 20. Bonnet Studs & Nuts:** The bonnet studs and nuts secure the bonnet to the body.
- 21. Seat Ring:** To ensure a stable shutoff, the seat ring is aligned and seal-welded into the valve, then precision ground for optimal seating.
- 22. Disc Guide:** The disc guides provide a stable track for keeping the disc aligned with the seat during cycling.
- 23. Spacer Ring:** Assists the packing rings in creating a seal above the back seat, between the bonnet and stem.

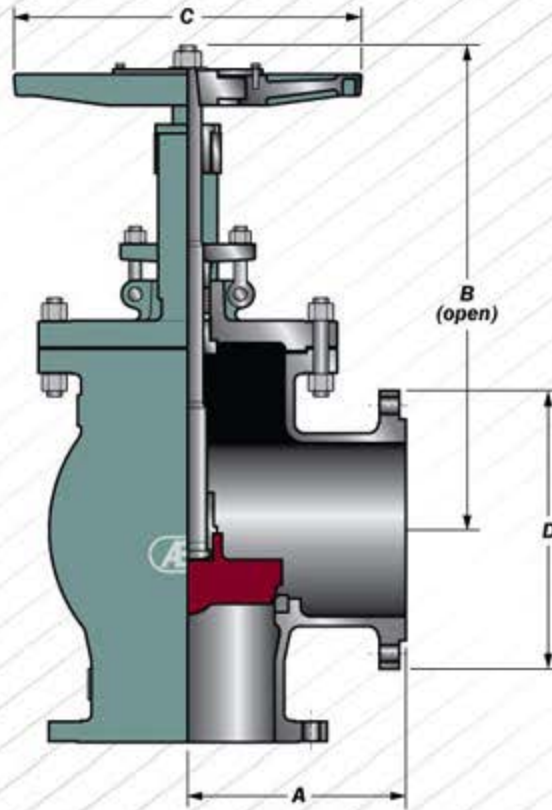


AES Cast Carbon Steel Bolted Bonnet Valves
Product Line Technical Data

Cast Steel Bolted Bonnet Angle Stop Checks
Class: 150 - Sizes: 2" thru 12"

Design and Manufacturing Standards

Valve Design: ASME B16.34/API 600
Flange Dimensions: ASME B16.5, B16.47
Face-to-Face Dimensions: ASME B16.10
Tested in Accordance with: API 598
Recommended Spare Parts*



Typical Bill of Materials

Component	A11	A18	A22	Component	A11	A18	A22
Body	ASTM A216 GR.WCB			Packing	Graphite w/Braided Carbon Fiber End Rings		
Seat Ring	ASTM A105/HF			Gland Bolt Pins	ASTM A36		
Disc 2" thru 4"	ASTM A276-410	ASTM A216-WCB/ HF	ASTM A276-316	Gland Bolts	ASTM 193-B7		
Disc 5" and larger	ASTM A216-WCB/ 13% Chrome		ASTM A216- WCB/316	Gland	ASTM A276-410	ASTM A276-316	
Disc Nut	ASTM A276-410		ASTM A276-316	Gland Flange	ASTM A216-WCB		
Stem	ASTM A276-410		ASTM A276-316	Gland Nuts	ASTM A194-2H	ASTM A194-2HM	
*Bonnet Gasket	Spiral Wound 316 Stainless Steel/Graphite			Stem Nut	ASTM A439-D2		
Bonnet	ASTM A216-WCB			Split Ring	ASTM A276-410		
Bonnet Studs	ASTM 193-B7			Handwheel Washer	ASTM A36		
Bonnet Nuts	ASTM A194-2H			Handwheel Nut	ASTM A36		
Back Seat Bushing	ASTM A276-410		ASTM A276-316	Handwheel	ASTM A539 Type (65-45-12)		
				Spacer Ring	ASTM A276-410	ASTM A276-316	

Class 150

Size	nps	2	3	4	6	8	10	12
	dn	50	75	100	150	200	250	300
A	in	4.0	4.75	5.75	8.0	9.75	12.25	13.75
	mm	107	121	146	203	248	311	349
B	in	15.2	16.9	20.4	21.8	27.4	31	37.8
	mm	386	429	518	554	696	787	960
C	in	8	10	12	15	18	22	24
	mm	203	254	305	381	457	559	610
D	in	6	7.5	9	11	13.5	16	19
	mm	152	191	229	279	343	406	483
RF	lbs	57	84	141	234	399	611	794
Wt.	kg	26	38	64	106	181	278	361

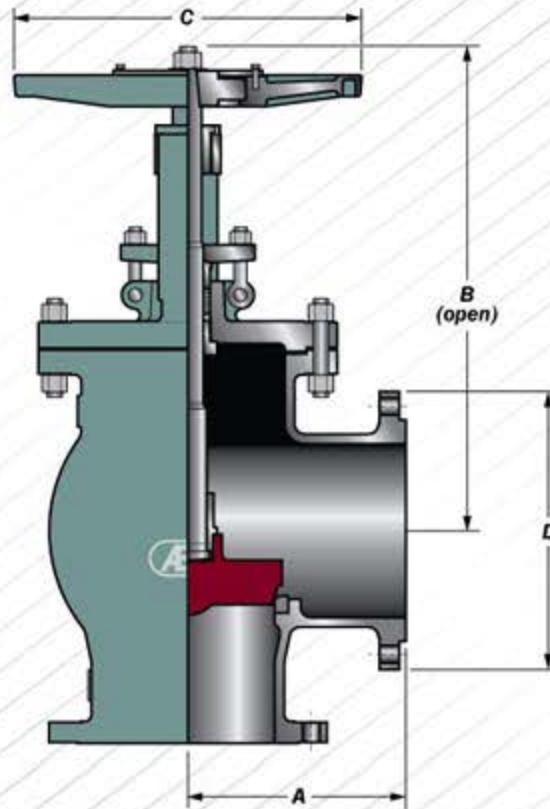
Note: Dimensions: Inches/Millimeters - Weights: Pounds/Kilograms. Larger sizes available on request. Dimensions are subject to change without notice.

AES Cast Carbon Steel Bolted Bonnet Valves
Product Line Technical Data

Cast Steel Bolted Bonnet Angle Stop Checks
Class: 300 - Sizes: 2" thru 12"

Design and Manufacturing Standards

Valve Design: ASME B16.34/API 600
Flange Dimensions: ASME B16.5, B16.47
Face-to-Face Dimensions: ASME B16.10
Tested in Accordance with: API 598
Recommended Spare Parts*



Typical Bill of Materials

Component	A11	A18	A22	Component	A11	A18	A22
Body	ASTM A216 GR.WCB			Packing	Graphite w/Braided Carbon Fiber End Rings		
Seat Ring	ASTM A105/HF			Gland Bolt Pins	ASTM A36		
Disc 2" thru 4"	ASTM A276-410	ASTM A216-WCB/ HF	ASTM A276-316	Gland Bolts	ASTM 193-B7		
Disc 5" and larger	ASTM A216-WCB/ 13% Chrome		ASTM A216- WCB/316	Gland	ASTM A276-410	ASTM A276-316	
Disc Nut	ASTM A276-410		ASTM A276-316	Gland Flange	ASTM A216-WCB		
Stem	ASTM A276-410		ASTM A276-316	Gland Nuts	ASTM A194-2H		
*Bonnet Gasket	Spiral Wound 316 Stainless Steel/Graphite			Stem Nut	ASTM A439-D2		
Bonnet	ASTM A216-WCB			Split Ring	ASTM A276-410		
Bonnet Studs	ASTM 193-B7			Handwheel Washer	ASTM A36		
Bonnet Nuts	ASTM A194-2H			Handwheel Nut	ASTM A36		
Back Seat Bushing	ASTM A276-410		ASTM A276-31	Handwheel	ASTM A539 Type (65-45-12)		
				Spacer Ring	ASTM A276-410	ASTM A276-316	

Class 300

Size	nps	2	3	4	6	8	10	12
	dn	50	75	100	150	200	250	300
A	in	5.25	6.25	7	8.75	11	12.25	14
	mm	133	159	178	222	279	311	356
B	in	15	16.9	21.7	28	30.7	37.5	41.6
	mm	381	429	551	711	780	953	1049
C	in	10	12	14	17	24	24	27
	mm	254	305	356	432	610	610	686
D	in	6.5	8.25	10	12.5	15	17.5	20.5
	mm	165	210	254	318	381	445	521
RF	lbs	68	108	198	392	560	934	1288
Wt.	kg	31	49	90	178	255	425	586

Note: Dimensions: Inches/Millimeters - Weights: Pounds/Kilograms. Larger sizes available on request. Dimensions are subject to change without notice.

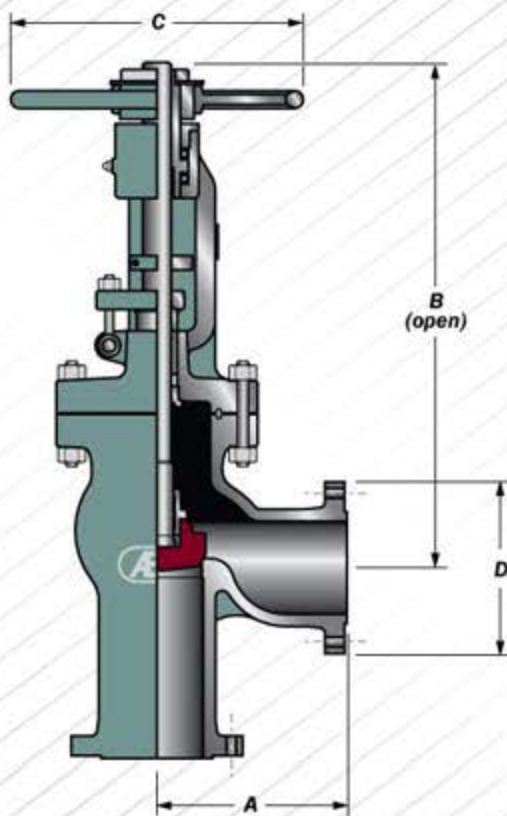
AES Cast Carbon Steel Bolted Bonnet Valves

Product Line Technical Data

Cast Steel Bolted Bonnet Angle Stop Checks
Class: 600 - Sizes: 2" thru 8"

Design and Manufacturing Standards

Valve Design: ASME B16.34/API 600
Flange Dimensions: ASME B16.5, B16.47
Face-to-Face Dimensions: ASME B16.10
Tested in Accordance with: API 598
Recommended Spare Parts*



Typical Bill of Materials

Component	A11	A18	A22	Component	A11	A18	A22
Body	ASTM A216 GR.WCB			Packing	Graphite w/Braided Carbon Fiber End Rings		
Seat Ring	ASTM A105/HF			Gland Bolt Pins	ASTM A36		
Disc 2" thru 4"	ASTM A276-410	ASTM A216-WCB/ HF	ASTM A276-316	Gland Bolts	ASTM 193-B7		
Disc 5" and larger	ASTM A216-WCB/ 13% Chrome		ASTM A216- WCB/316	Gland	ASTM A276-410	ASTM A276-316	
Disc Nut	ASTM A276-410		ASTM A276-316	Gland Flange	ASTM A216-WCB		
Stem	ASTM A276-410		ASTM A276-316	Gland Nuts	ASTM A194-2H		
*Bonnet Gasket	Spiral Wound 316 Stainless Steel/Graphite			Stem Nut	ASTM A439-D2		
Bonnet	ASTM A216-WCB			Split Ring	ASTM A276-410		
Bonnet Studs	ASTM 193-B7			Handwheel Washer	ASTM A36		
Bonnet Nuts	ASTM A194-2H			Handwheel Nut	ASTM A36		
Back Seat Bushing	ASTM A276-410		ASTM A276-316	Handwheel	ASTM A539 Type (65-45-12)		
				Spacer Ring	ASTM A276-410	ASTM A276-316	

Class 600

Size	nps	2	2.5	3	4	6	8
	dn	50	75	100	150	200	250
A	in	5.75	6.5	7.0	8.5	11.0	13.0
	mm	146	165	178	216	279	330
B	in	18.9	20.9	19.8	22.2	28.2	38.5
	mm	480	531	503	564	716	978
C	in	8.8	9.8	11.0	14.0	17.7	24.8
	mm	224	249	279	356	450	630
D	in	6.5	7.5	8.3	9.0	14.0	16.5
	mm	165	191	211	229	356	419
RF	lbs	79	110	141	256	640	961
Wt.	kg	36	50	64	116	291	437

Note: Dimensions: Inches/Millimeters - Weights: Pounds/Kilograms. Larger sizes available on request. Dimensions are subject to change without notice.



Pressure Temperature Ratings - ASME B16.34

Serving Your Energy Needs

Class 150							
Temperature °F	WCB*	LCC	WC6	WC9	C5	C12	C12A
-20 to 100	285	290	290	290	290	290	290
200	260	260	260	260	260	260	260
300	230	230	230	230	230	230	230
400	200	200	200	200	200	200	200
500	170	170	170	170	170	170	170
600	140	140	140	140	140	140	140
650	125	125	125	125	125	125	125
700	110	-	110	110	110	110	110
750	95	-	95	95	95	95	95
800	80	-	80	80	80	80	80
850	65	-	65	65	65	65	65
900	50	-	50	50	50	50	50
950	35	-	35	35	35	35	35
1000	20	-	20	20	20	20	20
1050	-	-	20**	20**	20**	20**	20
1100	-	-	20**	20**	20**	20**	20
1150	-	-	-	-	20**	20**	20
1200	-	-	-	-	20**	20**	20

Class 300							
Temperature °F	WCB*	LCC	WC6	WC9	C5	C12	C12A
-20 to 100	740	750	750	750	750	750	750
200	680	750	750	750	750	750	750
300	655	730	720	730	730	730	730
400	635	705	695	705	705	705	705
500	605	665	665	665	665	665	665
600	570	605	605	605	605	605	605
650	550	590	590	590	590	590	590
700	530	-	570	570	570	570	570
750	505	-	530	530	530	530	530
800	410	-	510	500	510	510	510
850	320	-	485	485	485	485	485
900	230	-	450	450	375	450	450
950	135	-	320	385	275	375	385
1000	85	-	215	265	200	255	365
1050	-	-	145	175	145	170	360
1100	-	-	95	110	100	115	300
1150	-	-	65	70	60	75	225
1200	-	-	40	40	35	50	145

Class 600							
Temperature °F	WCB*	LCC	WC6	WC9	C5	C12	C12A
-20 to 100	1480	1500	1500	1500	1500	1500	1500
200	1360	1500	1500	1500	1500	1500	1500
300	1310	1455	1445	1455	1455	1455	1455
400	1265	1405	1385	1410	1410	1410	1410
500	1205	1330	1330	1330	1330	1330	1330
600	1135	1210	1210	1210	1210	1210	1210
650	1100	1175	1175	1175	1175	1175	1175
700	1060	-	1135	1135	1135	1135	1135
750	1015	-	1065	1065	1065	1065	1065
800	825	-	1015	1015	1015	1015	1015
850	640	-	975	975	975	975	975
900	460	-	900	900	745	900	900
950	275	-	640	755	550	755	775
1000	170	-	430	535	400	505	725
1050	-	-	290	350	290	345	720
1100	-	-	190	220	200	225	605
1150	-	-	130	135	125	150	445
1200	-	-	80	80	70	105	290

Class 900							
Temperature °F	WCB*	LCC	WC6	WC9	C5	C12	C12A
-20 to 100	2220	2250	2250	2250	2250	2250	2250
200	2035	2250	2250	2250	2250	2250	2250
300	1965	2185	2165	2185	2185	2185	2185
400	1900	2110	2080	2115	2115	2115	2115
500	1810	1995	1995	1995	1995	1995	1995
600	1705	1815	1815	1815	1815	1815	1815
650	1650	1765	1765	1765	1765	1765	1765
700	1590	-	1705	1705	1705	1705	1705
750	1520	-	1595	1595	1595	1595	1595
800	1235	-	1525	1525	1525	1525	1525
850	955	-	1460	1460	1460	1460	1460
900	690	-	1350	1350	1120	1350	1350
950	410	-	955	1160	825	1130	1160
1000	255	-	650	805	595	760	1090
1050	-	-	430	525	430	515	1080
1100	-	-	290	330	300	340	905
1150	-	-	195	205	185	225	670
1200	-	-	125	125	105	155	430

Class 1500							
Temperature °F	WCB*	LCC	WC6	WC9	C5	C12	C12A
-20 to 100	3705	3750	3750	3750	3750	3750	3750
200	3395	3750	3750	3750	3750	3750	3750
300	3270	3640	3610	3640	3640	3640	3640
400	3170	3520	3465	3530	3530	3530	3530
500	3015	3325	3325	3325	3325	3325	3325
600	2840	3025	3025	3025	3025	3025	3025
650	2745	2940	2940	2940	2940	2940	2940
700	2665	-	2840	2840	2840	2840	2840
750	2535	-	2660	2660	2660	2660	2660
800	2055	-	2540	2540	2540	2540	2540
850	1595	-	2435	2435	2435	2435	2435
900	1150	-	2245	2245	1870	2245	2245
950	685	-	1595	1930	1370	1885	1930
1000	430	-	1080	1335	995	1270	1820
1050	-	-	720	875	720	855	1800
1100	-	-	480	550	495	565	1510
1150	-	-	325	345	310	375	1115
1200	-	-	205	205	170	255	720

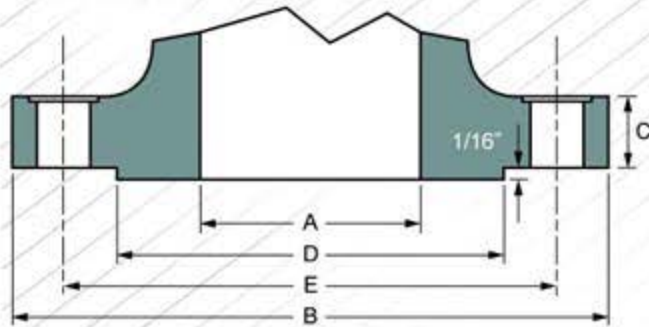
Class 2500							
Temperature °F	WCB*	LCC	WC6	WC9	C5	C12	C12A
-20 to 100	6170	6250	6250	6250	6250	6250	6250
200	5655	6250	6250	6250	6250	6250	6250
300	5450	6070	6015	6070	6070	6070	6070
400	5280	5865	5775	5880	5880	5880	5880
500	5025	5540	5540	5540	5540	5540	5540
600	4730	5040	5040	5040	5040	5040	5040
650	4575	4905	4905	4905	4905	4905	4905
700	4425	-	4730	4730	4730	4730	4730
750	4230	-	4430	4430	4430	4430	4430
800	3430	-	4230	4230	4230	4230	4230
850	2655	-	4060	4060	4060	4060	4060
900	1915	-	3745	3745	3115	3745	3745
950	1145	-	2655	3220	2285	3145	3220
1000	715	-	1800	2230	1655	2115	3030
1050	-	-	1200	1455	1200	1430	3000
1100	-	-	800	915	830	945	2515
1150	-	-	545	570	515	630	1855
1200	-	-	345	345	285	430	1200

* Not recommended for prolonged use above 800° F**. For weld end valves only. Flanged end ratings terminate at 1000° F. Note: Packing, gasket, or bolting may limit temperature. Please advise service temperature if above 1000° F. Ratings from ASME B16.34 standard class valves. Special class weld end valves to ASME B16.34 are available on special order.

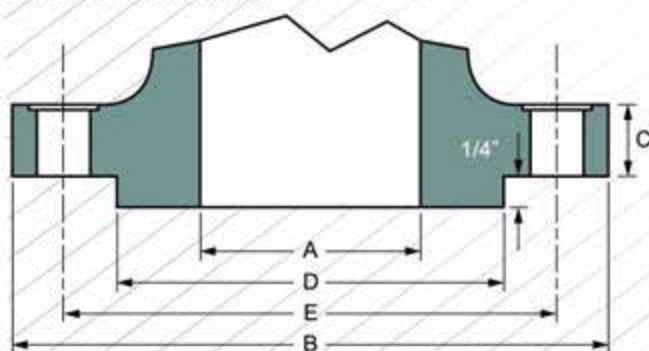


Flange Dimensions - ASME B16.5

Class 150 & 300



Class 600 thru 2500



Standards: NPS 24 and smaller in all classes conform to ASME B16.5. NPS 30 and larger conform to ASME B16.47 (Series A).

Facing: End flanges are regularly furnished with a raised face having a serrated finish per MSS SP-6. The thickness of the flange dimension (C) includes the raised face for Class 150 and 300. For Class 600 thru 2500, the flange dimension (C) does not include the 1/4" raised face.

Bolt Holes: Bolt holes are 1/8" larger than the bolt diameter. Bolt holes are drilled to straddle the center line.

Flange Dimensions in Inches									
Class	Size	A	B	C	D*	E	Stud Bolts		
							No.	Dia.	
300	2	2.00	6.50	0.88	3.62	5.00	8	0.63	
	2.5	2.50	7.50	1.00	4.12	5.88	8	0.75	
	3	3.00	8.25	1.12	5.00	6.62	8	0.75	
	4	4.00	10.00	1.25	6.19	7.88	8	0.75	
	5	5.00	11.00	1.38	7.31	9.25	8	0.75	
	6	6.00	12.50	1.44	8.50	10.62	12	0.75	
	8	8.00	15.00	1.62	10.62	13.00	12	0.88	
	10	10.00	17.50	1.88	12.75	15.25	16	1.00	
	12	12.00	20.50	2.00	15.00	17.75	16	1.13	
	14	13.25	23.00	2.12	16.25	20.25	20	1.13	
	16	15.25	25.50	2.25	18.50	22.50	20	1.25	
	18	17.00	28.00	2.38	21.00	24.75	24	1.25	
	20	19.00	30.50	2.50	23.00	27.00	24	1.25	
	24	23.00	36.00	2.75	27.25	32.00	24	1.5	
30	29.00	43.00	3.62	33.75	39.25	28	1.75		
36	34.50	50.00	4.12	40.25	46.00	32	2.00		
600	2	2.00	6.50	1.00	3.62	5.00	8	0.63	
	2.5	2.50	7.50	1.12	4.12	5.88	8	0.75	
	3	3.00	8.25	1.25	5.00	6.62	8	0.75	
	4	4.00	10.75	1.50	6.19	8.50	8	0.88	
	5	5.00	13.00	1.75	7.31	10.50	8	1.00	
	6	6.00	14.00	1.88	8.50	11.50	12	1.00	
	8	7.88	16.50	2.19	10.62	13.75	12	1.13	
	10	9.75	20.00	2.50	12.75	17.00	16	1.25	
	12	11.75	22.00	2.62	15.00	19.25	20	1.25	
	14	12.88	23.75	2.75	16.25	20.75	20	1.38	
	16	14.75	27.00	3.00	18.50	23.75	20	1.5	
	18	16.50	29.25	3.25	21.00	25.75	20	1.63	
	20	18.25	32.00	3.50	23.00	28.50	24	1.63	
	24	22.00	37.00	4.00	27.25	33.00	24	1.88	
30	27.37	44.50	4.50	33.75	40.25	28	2.00		
36	32.87	51.75	4.88	40.25	47.00	28	2.50		
900	3	2.88	9.50	1.50	5.00	7.50	8	0.88	
	4	3.88	11.50	1.75	6.19	9.25	8	1.13	
	5	4.75	13.75	2.00	7.31	11.00	8	1.25	
	6	5.75	15.00	2.19	8.50	12.50	12	1.13	
	8	7.50	18.50	2.50	10.62	15.50	12	1.38	
	10	9.38	21.50	2.75	12.75	18.50	16	1.38	
	12	11.12	24.00	3.12	15.00	21.00	20	1.38	
	14	12.25	25.25	3.38	16.25	22.00	20	1.50	
	16	14.00	27.75	3.50	18.50	24.25	20	1.63	
	18	15.75	31.00	4.00	21.00	27.00	20	1.88	
	20	17.50	33.75	4.25	23.00	29.50	20	2.00	
	24	21.00	41.00	5.50	27.25	35.50	20	2.50	
	1500	2	1.88	8.50	1.50	3.62	6.50	8	0.88
		2.5	2.25	9.62	1.62	4.12	7.50	8	1.00
3		2.75	10.50	1.88	5.00	8.00	8	1.13	
4		3.62	12.25	2.12	6.19	9.50	8	1.25	
5		4.38	14.75	2.88	7.31	11.50	8	1.50	
6		5.38	15.50	3.25	8.50	12.50	12	1.38	
8		7.00	19.00	3.62	10.62	15.50	12	1.63	
10		8.75	23.00	4.25	12.75	19.00	12	1.88	
12		10.38	26.50	4.88	15.00	22.50	16	2.00	
14		11.38	29.50	5.25	16.25	25.00	16	2.25	
16		13.00	32.50	5.75	18.50	27.75	16	2.50	
18		14.62	36.00	6.38	21.00	30.50	16	2.75	
20		16.38	38.75	7.00	23.00	32.75	16	3.00	
24		19.62	46.00	8.00	27.25	39.00	16	3.50	
2500	2	1.50	9.25	2.00	3.62	6.75	8	1.00	
	2.5	1.88	10.50	2.25	4.12	7.75	8	1.13	
	3	2.25	12.00	2.62	5.00	9.00	8	1.25	
	4	2.88	14.00	3.00	6.19	10.75	8	1.50	
	5	3.62	16.50	3.62	7.31	12.75	8	1.75	
	6	4.38	19.00	4.25	8.50	14.50	8	2.00	
	8	5.75	21.75	5.00	10.62	17.25	12	2.00	
	10	7.25	26.50	6.50	12.75	21.75	12	2.50	
	12	8.62	30.00	7.25	15.00	24.38	12	2.75	

Flange Dimensions in Inches								
Class	Size	A	B	C	D*	E	Stud Bolts	
							No.	Dia.
150	2	2.00	6.00	0.75	3.62	4.75	8	0.63
	2.5	2.50	7.00	0.88	4.12	5.50	8	0.63
	3	3.00	7.50	0.94	5.00	6.00	8	0.63
	4	4.00	9.00	0.94	6.19	7.50	8	0.63
	5	5.00	10.00	0.94	7.31	8.50	8	0.75
	6	6.00	11.00	1.00	8.50	9.50	12	0.75
	8	8.00	13.50	1.12	10.62	11.75	12	0.75
	10	10.00	16.00	1.19	12.75	14.25	16	0.88
	12	12.00	19.00	1.25	15.00	17.00	16	0.88
	14	13.25	21.00	1.38	16.25	18.75	20	1.00
	16	15.25	23.50	1.44	18.50	21.25	20	1.00
	18	17.25	25.00	1.56	21.00	22.75	24	1.13
	20	19.25	27.50	1.69	23.00	25.00	24	1.13
	24	23.25	32.00	1.88	27.25	29.50	24	1.25
	30	29.25	38.75	2.94	33.75	36.00	28	1.25
	36	35.06	46.00	3.56	40.25	42.75	32	1.50
42	40.87	53.00	3.81	47.00	49.50	36	1.50	
48	46.00	59.50	4.25	53.50	56.00	44	1.50	

*Note: Consistent with industry standard.

Standards Typically Used in Valve Manufacturing



Serving Your Energy Needs

American Petroleum Institute (API)

API RP 574 (1998) - Inspection practices for piping system components
API 589 (1998) - Fire test for evaluation of valve stem packing
API RP 591 (2003) - Process valve qualification procedure
API 594 (2004) - Check valves-flanged, lug, wafer & buttwelding
API 597 (1981) - Steel venturi gate valves, flanged, buttwelding ends
API 598 (2004) - Valve inspection & testing
API 599 (2002) - Metal plug valves - flanged, welding ends
API 601 (1988) - Metallic gaskets for raised-face pipe flanges & flanged connections (double-jacketed corrugated & spiral wound)
API 600 (2001) - Bolted bonnet steel gate valves for petroleum & natural gas industries "ISO adoption from ISO 10434"
API 602 (2005) - Steel gate, globe, & check valves for sizes DN100 and smaller for the petroleum & natural gas industries
API 603 (2001) - Corrosion-resistant, bolted bonnet gate valves-flanged & buttweld ends
API 604 (1981) - Ductile iron gate valves, flanged ends
API 605 (1988) - Large-diameter carbon steel flanges (nominal pipe sizes 26" through 60", classes 75, 150, 300, 400, 600, & 900 (replaced by ANSI/ASME B16.47)
API 606 (1989) - Compact steel gate valves, extended body (included in API 602) fire test for soft-sealed quarter-turn valves "ISO adoption from ISO 10497-5 2004"
API 607 (2005) - Fire test for soft-sealed quarter-turn valves "ISO adoption from ISO 10497-5 2004"
API 608 (2002) - Metal ball valves, flanged, threaded, & welding ends
API 609 (2004) - Butterfly valves-double flanged, lug- & wafer-type
API RP 941 (2004) - Steel for hydrogen service at elevated temperatures & pressures in petroleum refineries & petrochemical plants
API RP 520 (2000), Part 1 - Sizing, selection & installation of pressure relieving devices in refineries
API RP 520 (2003), Part 2 - Sizing, selection & installation of pressure relieving devices in refineries devices in refineries
API Spec 6A (2005) - Specification for wellhead & christmas tree equipment
API Spec 6D (2005) - Specifications for pipeline valves
API Spec 14D (1994) - Specifications for wellhead surface safety valves & underwater safety valves for offshore service
API 5B (2004) - Threading, gauging thread inspection of casing, tubing, & line pipe threads
API 6AM (2003) - Material toughness
API 6FA (1999) - Fire test for valves
API 6FC (1999) - Fire test for valves with backseals
API 6FD (1995) - Specification for fire test for check valves
API Q1 (2003) - Specification for quality programs for the petroleum, petrochemical, & natural gas

American Society of Mechanical Engineers (ASME)

ASME Code (1997 addenda) - Boiler & pressure vessel code
ASME A13.1 (1996) - Scheme for the identification of piping systems
ASME B1.1 (2003) - Unified inch screw threads, UN, & UNR thread form
ASME B1.5 (1997) - ACME screw threads
ASME B1.7M (1984) - Nomenclature, definitions, & letter symbols for screw threads
ASME B1.8 (1988) - Stub ACME screw threads
ASME B1.12 (1987) - Class 5 interference - fit thread
ASME B1.20.1 (1983) - Pipe threads, general purpose, inch
ASME B1.20.3 (1976) - Dry-seal pipe threads, inch
ANSI/ASME B16.1 (1998) - Cast iron pipe flanges & flanged fittings
ANSI/ASME B16.5 (2003) - Pipe flanges & flanged fittings: NPS 1/2" through 24"
ASME B16.9 (2003) - Factory made wrought steel buttwelding fittings
ANSI/ASME B16.10 (2002) - Face-to-face & end-to-end dimensions of valves
ASME B16.11 (2001) - Forged fittings, socket welding & threaded
ASME B16.20 (1998) - Metallic gaskets for pipe flanges: ring joint spiral wound & jacketed
ASME B16.21 (2005) - Non-metallic flat gaskets for pipe flanges
ASME B16.25 (2003) - Buttwelding ends
ANSI/ASME B16.33 (2002) - Manually operated metallic gas valves for use in gas piping systems up to 125 PSI (sizes NPS 1/2" through 2")
ANSI/ASME B31.1 (2004) - Power piping
ANSI/ASME B31.3 (2004) - Process piping
ANSI/ASME B16.34 (2004) - Valves flanged, threaded & welding end
ANSI/ASME B16.36 (1996) - Orifice flanges
ANSI/ASME B16.38 (1985) - Large metallic valves for gas distribution (manually operated, NPS 2-1/2" through 12", 125 PSIG maximum)
ANSI/ASME B16.42 (1998) - Ductile iron pipe flanges & flanged fittings: classes 150 & 300
ANSI/ASME B16.47 (1996) - Large diameter steel flanges
ANSI B17.1 (1967, R' 89) - Keys & keyseats
ANSI B18.2.2 (1987) - Square & hex nuts
ASME B31.4 (2002) - Pipeline transportation systems for liquid hydrocarbons & other ammonia & alcohols
ANSI/ASME B31.8 (2003) - Gas transmission & distribution piping systems
ANSI/ASME B36.10 (2004) - Welded & seamless wrought steel pipe
ANSI/ASME B36.19 (2004) - Stainless steel pipe
ANSI FCI-2 (1991) - Control valve seat leakage

American Society Non-destructive Test (ASNT)

ASNT-TC-1A (1996) - Recommended practice no. SNT-TC-1A 1996

American Society for Testing and Materials (ASTM)

British Standards Institute (BS)

BS 1414 (1975, R' 91) - Gate, wedge & double disk valves: steel
BS 1868 (1975, R' 91) - Check valves: steel
BS 1873 (1975, R' 91) - Globe & check valves: steel
BS 2080 (1989) obsolete - Flanged & buttweld end steel valves
BS 5146 - (withdrawn) Replaced by BS 6755 p.1 steel valves testing (1986) & BS 6755 p.2 (1984)
BS 5152 (1974, R' 91) - Globe & check: cast iron
BS 5153 (1974, R' 91) - Check: cast iron
BS 5159 (1974, R' 91) - Ball: cast iron & carbon steel
BS 5160 (1974, R' 91) - Globe & check: steel
BS 5163 (1986, R' 91) - Gate, wedge & double disk: cast iron
BS 5351 (1986, R' 91) - Ball: steel
BS 5352 (1986, R' 91) - Globe & check: steel
BS 5418 - (withdrawn) Replaced by BS EN 19 (1992) marking, general purpose industrial
BS 5840 (1980, R' 91) - Valve mating details for actuator operation
BS 6364 (1984, R' 91) - Cryogenic
BS 6683 (1985, R' 91) - Guide: installation & use of valves
BS 6755: Part 1 (1986, R' 91) - Specification for production pressure testing requirements
BS 6755: Part 2 (1987) - Specification for fire type-testing requirements
BS EN 19 (1992) - Marking of general purpose industrial valves

International Organization for Standardization

ISO 5211/1 (2001) - Industrial valves-part-turn actuator attachments
ISO 5211/2 (2001) - Part-turn valve actuator attachment-flange & coupling performance characteristics
ISO 5211/3 (2001) - Part-turn valve actuator attachment-dimensions of driving components
ISO 5752 (1982) - Metal valves for use in flanged pipe systems face-to-face & center-to-face dimensions
ISO 9000 (2005) - Quality management systems and fundamentals & vocabulary
ISO 10012-1 (1992) - Quality assurance requirements for measuring equipment

Manufacturers Standardization Society

SP-6 (2001) - Standard finishes for contact faces of pipe flanges & connecting-end flanges of valves & fittings
SP-9 (r2005) - Spot facing for bronze, iron & steel flanges
SP-25 (1998) - Standard marking system for valves, fittings, flanges & unions
SP-42 (2004) - Class 150 corrosion resistant gate, globe, angle, & check valves with flanged & buttweld ends
SP-44 (2001) - Steel pipeline flanges
SP-45 (2003) - Bypass & drain connections
SP-51 (2003) - Class 150w corrosion resistant cast flanges & flanged fittings
SP-53 (2002) - Quality standard for steel castings & forgings for valves, flanges, & fittings & other piping components: magnetic particle exam method
SP-54 (2002) - Quality standard for steel castings for valves, flanges, & fittings and other piping components: radiographic examination method
SP-55 (2001) - Quality standard for steel castings for valves, flanges other piping components-visual method for evaluation of surface irregularities
SP-60 (2004) - Connecting flange joint between tapping sleeves & tapping valves
SP-61 (2003) - Pressure testing of steel valves
SP-65 (2004) - High pressure chemical industry flanges & threaded stubs for use with lens gaskets
SP-67 (2000A) - Butterfly valves
SP-69 (2003) - ANSVMSS edition pipe hangers & supports, selection & application
SP-70 (1998) - Cast iron gate valves, flanged & threaded ends
SP-71 (1997) - Gray iron swing check valves, flanged & threaded ends
SP-72 (1999) - Ball valves with flanged or butt-welding ends for general service
SP-79 (2004) - Socket-welding reducer inserts
SP-81 (2001) - Stainless steel, bonnetless, flanged knife gate valves
SP-82 (1992) - Valve pressure testing methods
SP-84 (1990) - Valves - socket welding & threaded ends
SP-85 (2002) - Cast iron globe & angle valves, flanged & threaded ends
SP-86 (2002) - Guidelines for metric data in standards for valves, flanges, fittings & actuators
SP-88 (r2001) - Diaphragm valves
SP-91 (1992) - Guidelines for manual operation of valves
SP-92 (1999) - MSS valve user guide
SP-93 (r2004) - Quality standard for steel castings & forgings for valves, flanges & fittings & other piping components- liquid penetrant exam method
SP-94 (r2004) - Quality standard for ferritic & martensitic steel castings for valves, flanges, & fittings and others piping components - ultrasonic exam method
SP-96 (r2005) - Guidelines on terminology for valves & fittings
SP-98 (2001) - Protective coatings for the interior of valves, hydrants, & fittings
SP-99 (r2005) - Instrument valves
SP-101 (r2001) - Part-turn valve actuator attachment-flange and driving component dimensions & performance characteristics
SP-102 (r2001) - Multi-turn valve actuator attachment: flange and driving component dimensions & performance characteristics
SP-110 (1996) - Ball valves threaded, socket-welding, solder joint, grooved, & flared ends
SP-117 (2002) - Bellows seals for globe & gate valves
SP-118 (2002) - Compact steel globe and check valves-flanged, flangeless, threaded & welding ends (chemical & petroleum refinery service)
SP-120 (2002) - Flexible graphite packing system for rising stem steel valves (design requirements)
SP-121 (R2002) - Qualification testing methods for stem packing for rising stem steel valves

National Association of Corrosion Engineers (NACE)

MR0175 (2005) - Sulfide stress cracking resistant metallic materials for oil field equipment
MR0103 (2005) - Materials resistant to sulfide stress cracking in corrosive petroleum refining environments

Terms & Conditions

Serving Your Energy Needs

Definitions

- 1) **Supplier**
"Supplier" refers to AES Flow Controls, LLC, a Texas (USA) limited partnership, and all of its affiliated or related entities, including, but not limited to, its parent, subsidiary, affiliated companies, their officers, directors, employees and agents, individually and collectively.
- 2) **Customer**
"Customer," refers to all of the following:
 - a) any party acting as agent for the Customer, the party ordering goods or services on behalf of himself, herself or itself and others;
 - b) the person signing Supplier's credit application, service order, bill of lading, delivery receipt or ticket;
 - c) the store, factory, warehouse, shipping company, accepting agent, contractor or subcontractor of the job site, store, warehouse, transportation company, accepting agent;
 - d) the person accepting and/or ordering Supplier's goods and services acknowledges that he or she has the actual and apparent agency authority to bind the Customer and owner of the property the product will improve, to the terms and conditions of this agreement, all of whom are included in the term "Customer"; and
 - e) the person paying the invoices of Supplier, signing Supplier's service orders, delivery tickets, bills of lading or other Supplier contracts, acknowledges that he or she is the agent of the Customer and/or any entity who is benefited by the Supplier's product, and that they are said person's agent.
- 3) **Equipment**
"Equipment" refers to any goods and service, item of supply or equipment or property ordered or purchased by Customer or the Customer's agent from Supplier or provided by Supplier, including, but not limited to: valves, pipe, fittings, product or general equipment, supplies, parts, materials, supplies and/or merchandise sold by Supplier or provided in connection with Supplier's provider capabilities or needed by Supplier to assist Supplier in the performance and delivery of its product to Customer, but "Equipment" excludes "Services" as defined below.
- 4) **Services**
"Service(s)" refers to all employees or agents furnished by Supplier as consultants and/or to perform any function, including the operation of equipment which performs any function, trucks or other merchandise necessary to perform any function when operated by Customer's employees or agents or the Supplier's employees or agents on Customer's job or to satisfy the Customer's order or orders.
- 5) **Claims**
"Claim(s)" refers to all of the following:
 - a) any liability of Supplier to Customer; b) loss of equipment, time, money, or profit of Supplier; and c) claim, demand, cause of action, proceeding, damage to person, damage to personal or real property, damage and penalty, including attorney's fees, costs and expenses.

General Terms & Conditions

Customer acknowledges that it has reviewed and agrees to be bound by the above and following (Definitions, Terms and Conditions and all of the language contained herein and in related documents described elsewhere herein) whenever it or its employees, transportation and/or warehouse company, its customer or end user, and/or agent either: i) accepts the Equipment or Services of Supplier; or ii) signs a Credit Application, service order, delivery ticket, bill of lading or contract for goods or services; or iii) receives an invoice from Supplier and/or orders more Equipment or Services from Supplier.

- 1) **Entire Contract**
The Terms and Conditions herein, in the invoice, acknowledgement or acceptance of Customer's order, Price Book, Manual and Credit Application as defined above and elsewhere herein, the other documents aforementioned, all of which are incorporated herein by reference for all purposes, constitute the entire contract ("Contract") between the parties and may not be amended except in writing signed by Supplier's authorized representative.
- 2) **Controlling Terms and Conditions**
Equipment or Services furnished to Customer by Supplier or its agents will be controlled only by the Terms and Conditions contained herein and contained in the other documents of Supplier mentioned herein and these are the only terms and conditions to which these parties shall be bound. In the event that Customer writes any letters or uses any other document generated by Customer to order or accept Supplier's Equipment or Services, the Terms and Conditions contained herein shall control and this document does hereby serve as an objection thereto.
- 3) **Failure of Any Party to Enforce**
The failure of either party to enforce any provision hereof will not constitute a waiver or preclude subsequent enforcement thereof.
- 4) **Invalidity of Any Term or Condition Contained Herein**
No partial invalidity of this Contract will affect the remainder. In the event that any term or condition contained herein is found to be invalid, the parties agree that the remainder of Supplier's contract shall remain valid.
- 5) **Jurisdiction and Venue; Construction of Terms and Conditions**
The Parties hereto agree that the terms and conditions of Supplier's documents mentioned herein and the Terms and Conditions of this document shall be construed in accordance with the laws of the State of Texas or, if offshore, in accordance with General Maritime Law of the United States, without giving effect to respective conflicts of law principals, or Supplier at its exclusive option may choose the Jurisdiction to interpret the terms and conditions contained herein and in the other documents mentioned herein. In the event of litigation between Customer and Supplier, Customer hereby waives any claim it may have to any jurisdiction and venue other than that chosen by Supplier. Customer agrees that it is to perform its obligations herein in Houston, Harris County, Texas, non-exclusively to include payment.

- 6) **Credit**
Terms are cash in advance unless credit is approved in writing prior to the sale. If credit is approved, Customer must maintain credit satisfactory to Supplier. When Customer or its agent signs any of Supplier's documents in the process of ordering or receiving Equipment or Services from Supplier, it states for Supplier's reliance that it has the current ability to pay for the Equipment or Services ordered or accepted and it further agrees that Supplier reserves the right to require Customer to furnish security for performance of Customer's obligations. Payments shall be made in U.S. Dollars net 30 days at Supplier's address in Houston, Harris County, Texas. If credit terms are not met or Customer otherwise fails to follow the Terms and Conditions contained herein, in addition to its other legal rights, Supplier may and Customer hereby authorizes Supplier to: a) defer or cancel further shipments of Equipment or Services site on which the Equipment of Supplier is located by taking any necessary action, including, but not limited to, opening gates, cutting locks, cutting chains; c) authorize any other company to remove its equipment from any location, to the extent needed for Supplier to be able to remove its equipment, and said company moving its equipment shall send its bill for the same to Customer or Supplier may pay said bill and include the same in its bill to Customer; d) take any action needed to remove its equipment from the job site; e) act as stated herein at the expense of Customer and Customer hereby indemnifies and holds harmless Supplier from any harm arising from said actions, including, but not limited to, environmental harm, harm to the real property and personal property and harm to the real and personal property of any third party; and f) charge Customer interest on any unpaid balance at the lesser of: i) eighteen percent (18%) per annum, or ii) the maximum rate permitted by applicable law.
- 7) **Taxes**
Customer shall be responsible for all customs fees, duties, and foreign, federal, state or local taxes (including, sales, use, excise or similar taxes and foreign withholding taxes).
- 8) **Transportation**
For Equipment sold, Customer may arrange shipment and will pay all crating, handling and shipping costs. Risk of loss passes to Customer at the time Customer and/or any carrier takes possession of the Equipment from Supplier. For Equipment sold where Customer does not timely furnish shipping instructions or requests that Supplier arrange shipment, such transportation shall be in a commercially reasonable manner at Customer's risk and invoiced to Customer at current freight rates, plus all handling incurred, or at the prevailing mileage rate for any vehicles used by Supplier's personnel. Risk of loss will then pass to Customer at the time the Equipment leaves Supplier's premises, warehouse or store. All claims for shortages, damages, corrections or deductions must be made in writing within 10 days from receipt of goods and if shipper fails to comply, it waives its right to make a claim.
- 9) **Consequential and Incidental Damages**
Supplier will not be responsible for consequential or incidental damages of any kind, which shall include, but not be limited to, loss of profits, use or business opportunity, damages for failure to meet deadlines, pollution damage and/or wreck or debris removal expense and Customer holds harmless and indemnifies Supplier from all harm arising from any claims made against Supplier from out of any of these things.
- 10) **Force Majeure**
Supplier will not be liable for any damages, including special and consequential damages, as stated above, caused by events of force majeure or any other occurrences beyond Supplier's reasonable control subject to all of the limitations contained herein. In such event, the time for performance will be extended automatically for such reasonable time as is necessary to permit performance hereof.
- 11) **Disclaimer of All Warranties Except Those Specifically Granted Herein** Supplier hereby disclaims all warranties except those specifically granted and states as follows:
 - a) Supplier makes no warranties of any kind regarding its equipment and/or services;
 - b) technical information and any assistance in equipment installation or technical or engineering information concerning equipment or services provided by Supplier will be advisory only, at Customer's sole cost and on an "as is" basis;
 - c) no warranty is given with respect to such services or information and Supplier will not be liable for any claims arising from its furnishing or Customer's use of such assistance or information;
 - d) Supplier specifically disclaims all implied warranties, the warranty of merchantability, warranty of fitness for a particular purpose and any warranty that the equipment or service provided by Supplier will actually accomplish the goal(s) desired by Customer. Supplier grants to Customer only a limited warranty as follows: Supplier grants only to Customer only a 1-year warranty on material and workmanship on its new products commencing at date of shipment.
- 12) **Insurance**
The parties agree that the indemnities provided by Customer to Supplier herein shall be supported either by available insurance or that Customer shall voluntarily become self-insured, in whole or part and upon request of Supplier prove that Customer is good for the loss and that Customer is sufficiently self insured. In addition, Customer shall, at its expense, maintain adequate insurance to fully protect any Equipment or Services or personnel supplied by Supplier and shall supply to Supplier, upon request, satisfactory evidence of sufficient insurance coverage to protect Supplier, Supplier's property, Supplier's personnel and Supplier's liability.
- 13) **Prices**
All Supplier's, terms, conditions, prices, rates and charges are subject to change without notice.
- 14) **Assignment**
Customer may not assign any rights or obligations hereunder, without Supplier's prior written consent.
- 15) **Amendment of Indemnities to Conform to Law**
The indemnities provided by Customer herein shall be limited to the extent necessary for compliance with applicable state and federal laws.

Terms & Conditions (Continued)

16) Termination/Cancellation

Unless provided otherwise in writing herein, Customer cannot terminate or cancel any order once Supplier has accepted the order. No termination shall relieve Customer of any liability incurred and Customer's obligations shall survive such termination, including all hold harmless and all indemnities and all warranties & non-warranties contained herein which are made expressly for the benefit of Supplier.

- Termination Policy: No goods or products supplied pursuant hereto may be returned without Supplier's written permission. Supplier assumes no responsibility without Supplier's written permission. All returns shall be made freight prepaid. Supplier will charge to Customer a 25% Restocking Charge upon the return of goods by Customer.
- Special Orders: A special order is an order for any product of Supplier or which comes from Supplier's sources which is non standard requiring separate/additional manufacturing, engineering, modification, tooling and machining. If Supplier agrees in writing that a Special Order can be terminated. Special Orders cannot be cancelled unless Customer agrees in writing to pay for all work including engineering completed up to the time of cancellation.

17) Default

If Customer ever defaults on or breaches any Term or Condition contained herein or in any other document of Supplier mentioned above, all charges for all Equipment and Services provided by Supplier for Customer's benefit shall automatically accelerate and shall immediately become due and payable, notwithstanding any other provision which would afford Customer, under normal circumstances, any stated amount of time in which to pay for said charges. In addition, all discounts which may have been offered to Customer shall automatically and immediately be revoked and become fully due and owing with no action or notice from Supplier, notwithstanding any other provision to the contrary. If Customer ever disputes any charges of Supplier, Customer shall tender to Supplier all amounts for all charges which are not disputed by Customer. Customer hereby indemnifies and holds Supplier harmless for and agrees to reimburse Supplier for all costs of collections, including, but not limited to, actual attorney's fees and costs incurred in connection with the collection of past due amounts and defending against any counterclaims. Notwithstanding any other provision in this document or any other document or check, Customer agrees that all payments received by Supplier on Customer's account may be applied first to all outstanding interest and then to the oldest amounts owed by Customer to Supplier, and this provision is not waived by Supplier by accepting any check from Customer containing contrary language.

18) Customer Holds Harmless and Indemnifies Supplier

Customer shall hold harmless, defend, indemnify, release and hold Supplier harmless from and against any and all claims by Customer, Customer's customer, owner, or any other person or entity against Supplier of every kind or character, whatsoever, whether such claims are based on theories of contract law, tort law, or otherwise, direct or indirect, including incidental, special and consequential damages caused by Supplier arising out of delivery, pick-up, repair, use or operation of equipment or services relating to execution, completion or termination of this contract or on account of bodily injury or death or property damage, destruction or economic loss (including, but not limited to release of radioactive materials, contamination or damage to real property or personal property, land, buildings, vehicles, or property rights) because of purchase, delivery, installation, possession, operation, use, condition or return of goods, people, services and/or equipment used, purchased, or used during the term of this contract, or on account of infringement of any patent, design, copyright, or trade name or mark, whether by Supplier, Customer or otherwise, irrespective of whether Supplier was concurrently negligent or at fault for any such claims where the damage, injury or death was caused by the sole or partial negligence of Supplier.

19) Inspection

Customer's acceptance of delivery and signature of its representative on any delivery tickets or other Supplier documents is conclusive evidence that Customer found the Equipment to be suitable for its needs and in good condition and that the signor was the agent for Customer or Customer's Customer, building or land owner, contractor, sub contractor and operator. Customer also has a duty to inspect Equipment prior to use and to notify Supplier immediately of any defects and before use of the Supplier's product. SALE TERMS. The following are in addition to and a part of all other Terms and Conditions provided for herein.

20) Limited Liability/Disclaimer

- Supplier does warrant Equipment sold by Supplier to Customer to be free from defects in material or workmanship.
- In the event that a court finds that Supplier is liable for any breach of contract or any breach of warranty, Supplier's liability for said breach is expressly limited to the repair or replacement, at its sole option, of any Equipment which proves to be defective during any period declared by the court to be a period of warranty. All such Equipment shall be repaired or replaced F.O.B. Supplier's plant, warehouse, store or premises.
- In the event that a court finds that Supplier has an obligation to repair or replace equipment, said repair or replacement constitutes agreed and liquidated damages for any breach of Supplier's actual or court-declared warranty.
- The remedies stated above for any such breach thereof, shall be in lieu of all other warranties, express or implied, including all other warranties for merchantability or fitness for any particular purpose which Supplier has specifically disclaimed herein, and in lieu of liability for Supplier's negligence or fault and Customer's rights and remedies under the Texas deceptive trade practices consumer protection act (chapter 17, Texas business and commerce code).

21) Prices

- Prices for standard equipment will be the sales price shown on Supplier's current product sales price list ("Price List") or Price Book, F.O.B. Supplier's plant, warehouse, district stock points, or premises.

- Requests for quotations for nonstandard Equipment should be sent to the appropriate Supplier office. Quoted prices are valid for 30 days after the date of the quotation, unless otherwise noted on the quotation or unless canceled by Supplier prior to Customer's acceptance.
- Cost of additional labor, materials or outside services for modification of such procedures or specifications requested by Customer will be charged to Customer at Supplier's prevailing rate.
- Services required to install Equipment will be based on the prevailing rates at the time of installation.

22) Delivery/Disclaimer

- Supplier will use its best efforts to have Equipment ready for shipment, subject to receipt of all necessary Customer information, including approved drawings. HOWEVER, SUPPLIER ASSUMES NO LIABILITY FOR DAMAGES INCURRED AS A RESULT OF ITS LATE DELIVERY OF EQUIPMENT, SUPPLIES, PRODUCT, PERSONAL PROPERTY, REGARDLESS OF CAUSE.
- Title and risk of loss will pass to Customer upon delivery of Equipment, F.O.B. Supplier's plant, warehouse or premises.
- If unable to deliver, Supplier may charge Customer its customary storage rates and Customer will maintain all-risk property insurance on Equipment, at its replacement value. Supplier will not be liable for deterioration of Equipment, personal property, product resulting from atmospheric conditions, acts of God, or other events regardless of whether they are within Supplier's reasonable control while in Supplier's possession or in transit to Customer's destination or location.

Service Terms

The following are in addition to and a part of all other Terms and Conditions provided for herein.

1) Limited Liability/Disclaimer

- Supplier will use its best efforts to ensure that all personnel furnished are competent and that Equipment, supplies, personal property or product furnished is in good condition; guarantee of any kind whatsoever except as provided herein.
- Supplier's personnel are hereby indemnified and released from the liability of, because of the nature of the work to be accomplished and because of the unpredictable conditions which always exist, such results as required by Customer or Customer's Customer cannot be and are not guaranteed or warranted and Customer agrees that Supplier makes no warranties of any kind and that Supplier does not guarantee any particular result as from furnishing people, goods, product, personal property, equipment or services.
- Supplier reserves the right not to do work if, in its sole discretion, job conditions render such action inadvisable for any reason or unsafe for any reason.
- Customer agrees that any employee(s) furnished by Supplier shall not be responsible for any final decision made on any job. Rather, Customer shall retain complete control and supervision of the job, building site, project and performance of operations in and about the job site.
- Customer shall pay Supplier for Equipment and Services regardless of whether the desired results are achieved without any deduction or offset of any kind, irrespective of any Claims which Customer may assert or allege against Supplier or any Supplier and/or manufacturer of Equipment and/or Services, at the rates indicated in the Customer's document, manual, delivery documents or Price Book in effect at the time of delivery.
- Customer will be invoiced at the sales rate or service rates in effect at the beginning of the invoice period.
- Supplier makes no warranty or representation of any kind, express or implied, as to the quality, performance or function of its people, as to the design, operation, condition or quality of the material or workmanship of equipment or performance of equipment delivered to Customer, it being agreed that all such risks as between Supplier and Customer are to be borne by Customer, regardless of whether such equipment is operated under Supplier's supervision, and all equipment, services and people are accepted by Customer "as is" except as provided elsewhere herein. Customers desiring different standards than those contained herein should, at Customer's expense, obtain an inspection of goods, services, equipment and people prior to use and the benefits of any and all implied warranties of Supplier are hereby waived by Customer except as elsewhere provided herein.

2) Charges

All charges are on a daily basis for a 24-hour day or any part stated therein.

- Services
 - All Services are on a daily or hourly basis, subject to any minimum charge, all of which are specified by Supplier in Supplier's documents mentioned herein;
 - charges begin when each Service person departs Supplier's store location where said person or Equipment is based and the charges shall continue until returned to that store;
 - Customer shall furnish quarters and meals for Supplier's personnel or reimburse Supplier for reasonable living expenses incurred at the prevailing rate from the time each Service person leaves the Supplier's location until return to Supplier's location;
 - if personnel and/or Equipment are dispatched at Customer's request, but are later canceled, Customer will be invoiced for a "dead call" as provided in the Price Book or other Supplier documents mentioned herein.
- Standby Charges: Standby rates may be applied under conditions specified in the Price Book.

3) Trade Discount

Trade discounts, if any, apply only to Equipment, goods, or services which are paid for within 30 days of the invoice date. In the event payment is not timely made, with time being deemed to be of the absolute essence, all discounts granted are automatically revoked and reversed on Customer's account and are fully due and owing.



Serving Your Energy Needs

AES Flow Controls

5750 N Sam Houston Parkway, #115B

Houston, TX 77032, USA

Tel: +1 (713) 589 3208

Fax: +1 (800) 839-4506

Website: www.aesflowcontrols.com

Email: info@aesflowcontrols.com