

# SWING CHECK VALVES CATALOGUE

BOLTED BONNET AND PRESSURE SEAL  
FCA RS AND RPS MODEL CHECK VALVES



# FCA

FLOW CONTROL APPLICATIONS



## FCA - WORKING CLOSELY WITH YOU TO ACHIEVE EXCELLENCE

Even with the most careful and meticulous planning, the success of a project can only be assured with good execution after the contract is signed. **FCA** team of engineering designers, production specialists, logistics experts and process engineers, plays its role to ensure quality products, timely delivery, smooth start-up and plant optimization.

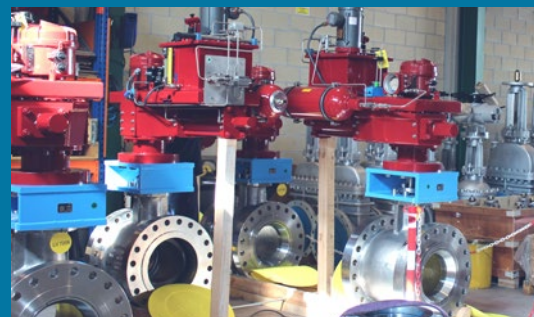
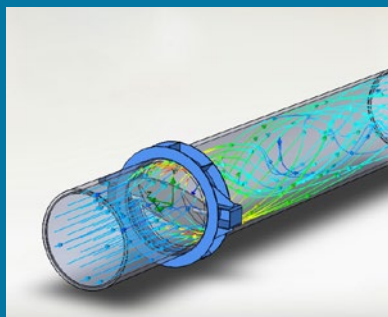
More and more customers trust our DNV certified solutions. **FCA** innovation-driven valves find solutions to any customer challenge or toughest application.

Our target-oriented dynamic team provides **FCA** with enough expertise to efficiently handle highly customized orders. Knowledge of how to manage our resources and capabilities ensures **FCA** to bring customers' expectations further.

Advanced software applications including Finite Element Analysis (FEA), computational fluid dynamics and three-dimensional solid modeling, and our proven know-how, help **FCA** designing high specification valves that meet the most demanding working requirements.

**FCA** aims partnering with major EPCs and End Users to develop innovative solutions for their valving needs. **FCA** specific capabilities include valve design; stress and finite element analysis; flow analysis; MAST and torque calculation; actuator sizing; testing and test data analysis; and validation of retrofit changes.

**FCA** offers a wide range of solutions for the toughest industry applications to meet each customer's requirements. This target is only achievable having a flexible multidisciplinary team focused on each customer's particular needs. **FCA** puts effort and makes sure that offers the most complete package assuring the highest quality.



## WORLDWIDE

### THERE WHERE OUR CUSTOMER IS

From a global vision of the sector and development dynamics of each country, **FCA** offers revolutionary supply alternatives to the customer, preserving the quality from its full design in Ibarra (Spain). Thanks to innovative applications, a professional team and its experience, **FCA** ensures quick response and results tailored to the needs of the customers anywhere in the world.

Its international service network is geared towards local attention in order provide flexible, close and customized solutions; getting so successful responses to new market needs and continuing to expand the activity at a geographical and sectorial level.

**FCA** valves are used in a wide range of applications such as Hydro Power plants and dams, mineral processing, Oil and Gas, Chemical and Petrochemical plants, Pulp and Paper, Steel industry, Thermal Power plants, Water treatment, Water distribution and Water pump stations as principal applications. Oriented according to main **OIL & GAS, MINERALS, POWER** and **WATER** sectors.



## QUALITY

Due to the applications where our products are installed, our standards are highly demanding. **FCA** valves are engineered to meet most industry's or key player's requirements, providing full code compliance solutions.

**FCA** comply with ISO 9001-2000 quality standard, guaranteed and certified by DNV. Additionally, international certifications are met such as CE for Pressure Equipment Directive (97/23/EC), Directive 2006/42/EC for machinery, ATEX Directive 94/9/EC, GOST TR/CU, etc...



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BOLTED BONNET DESIGN  
SWING CHECK VALVES

- CLASS 150#
- CLASS 300#
- CLASS 600#

PRESSURE SEAL DESIGN SWING  
CHECK VALVES

- CLASS 600#
- CLASS 900#
- CLASS 1500#
- CLASS 2500#



# SPECIFICATIONS AND STANDARDS

Check valves have an extended use in many industrial applications such as oil&gas, chemical and petrochemical plants, thermal applications, fertilizer plants, etc... **FCA** swing check valves are designed in accordance with API 6D and ASME B16.34. These valves allows fluid circulating in one direction, preventing reversal flow in horizontal pipelines. They have the ability to react quickly and automatically to direction changing.

These automatically actuated valves respond to the flow media (pressure and velocity) for opening and to the gravity force for closure. The disc, mounted on an arm that rotates on a hinge pin, is able to go through the body from side to side sealing the flow in the metal seat. Design prevents disc from being opened too high, thus causing failure to be closed down.

**RS** bolted bonnet design model ensures a perfect performance and sealing for pressure ratings up to ASME Class 1500#. For high sizes and pressure ratings up to 2500# **RPS** Pressure seal bonneted design model is available, performing a higher sealing force as internal pressure is increased.

**FCA** Check valves come with a variety of end connections: Flanged type, as standard, comes with Raised Face (RF) according to ASME Class 150#, 300# and 600#, and with Ring-Type-Joint flanges (RTJ) for Class ratings of 900#, 1500# and 2500#. Buttwelded ends can also be supplied, with schedule according to customer specifications.



## COVERING STANDARDS

**FCA** Check Valves are mainly designed and manufactured according to API 6D "Specification for pipeline valves" and considering standards such as ASME BPVC "Boiler and Pressure Vessel Code", ASME B16.34 "Valves Flanged, Threaded and Welding Ends", ASME B16.10 "Face to Face dimensions of Flanged valves", ANSI B16.5 "Pipe Flanges and Flanged Fittings", ANSI B16.25 "Buttwelding Ends".

Other applied standards related to other requirements and testing are ANSI/API 607 "Fire Test for Soft-Seated Quarter Turn Valves", API 6FA "Specification for Fire Test for Valves", API 598 "Valve Inspection and Testing"...



# GENERAL FEATURES

## HIGHLIGHTS

- Design and Manufacture according to API 6D and ASME B16.34.
- Full port design suitable for pigging operations.
- Lifting points.
- Suitable for horizontal & vertical upflow (not recommended) installation possibility.
- Optional bottom drain plug.
- Hardfacing coating with Stellite, ENP or Tungsten carbide.
- Wide range of body, bonnet and trim materials.
- Uni-directional flow.
- Bolted or Pressure seal bonnet configuration.

## SECTORS

- Oil & Gas.
- Mineral Processing.
- Petrochemical plants.
- Steel industry.
- Thermal Power plants.
- Water distribution.
- Water pump stations.
- etc...

## APPLICATIONS

- Natural Gas pipelines.
- Oil pipelines.
- Refineries.
- Steam isolation.
- High temperature.
- Corrosive fluids.
- etc...



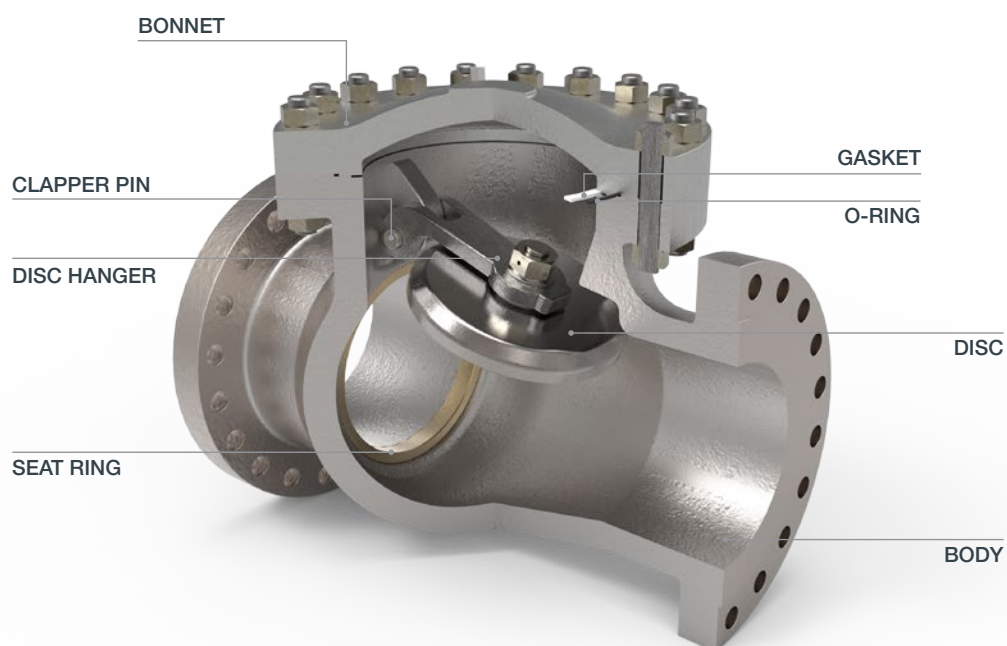
## MANUFACTURING PROGRAM

TYPE	CLASS	2"	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"	28"	30"	36"
Bolted bonnet design [RS Mod.]	150#	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	300#	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	600#	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Pressure seal design [RPS Mod.]	600#	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	900#	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	1500#	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	2500#	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

## GENERAL MATERIALS

<b>BODY</b>	WCB / WCC / A105 / LCB / LOC / WC6 / CF8M / CF3M / F316 / F51 / 4A
<b>DISC</b>	WCB / WCC / A105 / LCB / LOC / WC6 / CF8M / CF3M / F316 / F51 / 4A
<b>BONNET</b>	WCB / WCC / A105 / LCB / LOC / WC6 / CF8M / CF3M / F316 / F51 / 4A
<b>CLAPPER PIN</b>	SS316 / SS410
<b>SEAT RING</b>	A105 / F6A / SS316 / CF8M / CF3M / F51 / 17-4PH
<b>GASKET</b>	GRAPHITE / SS316+GRAPHITE
<b>DISC HANGER</b>	WCB / WCC / A105 / LCB / LOC / WC6 / CF8M / CF3M / F316 / F51 / 4A
<b>O-RING</b>	VITON
<b>BOLTING</b>	B7 / B7M / B8 / B8M / L7

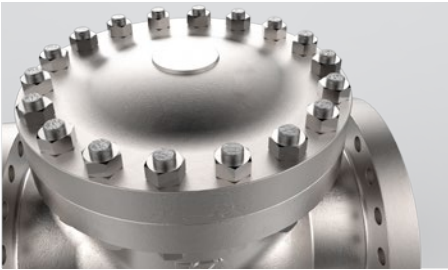
Stellite or tugnsten faced for seat ring availability.  
Special applications available under request.



## BODY AND BONNET

**FCA** designed various body-bonnet constructions such as bolted bonnet or pressure seal design. Bodies and bonnets are high quality with uniform section cast and then precisely machined, offering high performance and preventing stress concentrations.

The bodies provide a full port that ensures minimal turbulences, reduces erosion effect and minimizes resistance to flow.

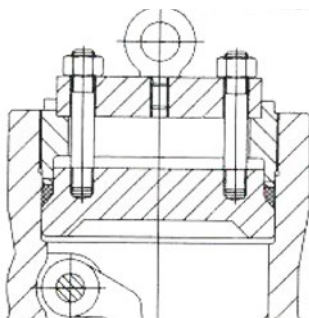


## BODY AND BONNET JOINT

Body and bonnet joints of **FCA** valves are designed with a more than adequate number of bonnet bolts. The standard joint varies, depending on valve Class. For Class 150# gate valves consist of a square joint or oval design depending on size. According to valve service it can be supplied flat-face gasket with graphite or PTFE. Class 300# and 600# valves consist of a circular spiral wound gasket. For class 900# and above consist of a ring type joint.

## PRESSURE SEAL BONNET DESIGN

In pressure seal bonnet designs the sealing is achieved through a graphite gasket that takes advantage of the internal pressure of the line. This configuration reduces the weight of the valve since avoids large diameter body bonnet connection flange and large size body-bonnet bolting.



## DISC ASSEMBLY

Robust one-piece disc has been designed to withstand severe shock operation of check valves. Disc sealing surface can be hardfaced by welding with metal material or inlaid with non-metal material according to customer requests. It provides enough intensity and rigidity and assures good sealing contact.

Disc is fastened securely to the hanger disc with a lock nut and cotter pin. The hinge pin connects it with the body and allows a long life valve operation.



## ANTI-CORROSIVE TREATMENTS

As standard, iron or carbon steel components are painted with an anti-corrosive treatment, providing the necessary protection against corrosion and an excellent surface finish.

Painting consists of:

- Epoxy primer with excellent corrosive protection and adhesion on every type of metal.
- BLUE RAL-5019 painting.

Depending on the valve application, FCA offers special treatments for specific abrasive and corrosive solutions like hardening, valve or component protective coating, etc... More information on request.

## MATERIAL SELECTION

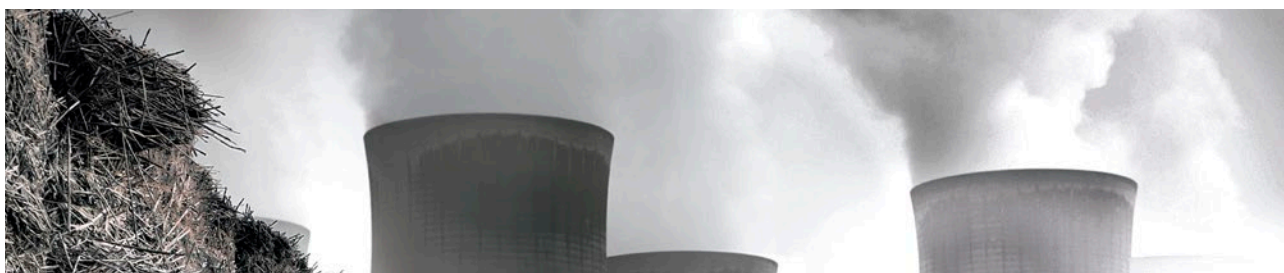
For material selection fluid type characteristic, pressure and working temperature shall be considered. FCA carries many years of experience with special materials such as duplex, superduplex, hastelloy, inconel, nickel alloys, etc... Moreover standard forged or casted steels are daily work standard for our engineers. Other materials could be considered and provided on request according to customer specifications.

For internal parts such as seat rings and disc, corrosion and wear resistant materials are considered in addition to pressure drop values and temperature working range specifications. Stainless steel materials are provided as standard, considering Stellite contribution for seat components, and hardened stainless steels for higher corrosion resistance.

The following table presents frequently used materials for FCA gate valves, generally selected for severe service working applications:

MATERIAL	CASTED (ASTM)	FORGED (ASTM)
Carbon Steel	A216 Gr. WCB	A105
Stainless Steel	A351 Gr. CF8 / CF8M	A182 F316
Duplex Steel	A890 Gr. 4A	A182 F51
Superduplex Steel	A890 Gr. 5A / Gr. 6A	A182 F53 / F55
Inconel	-	Alloy 718

\*Other materials on request.



## Cv FLOW COEFFICIENT VALUES

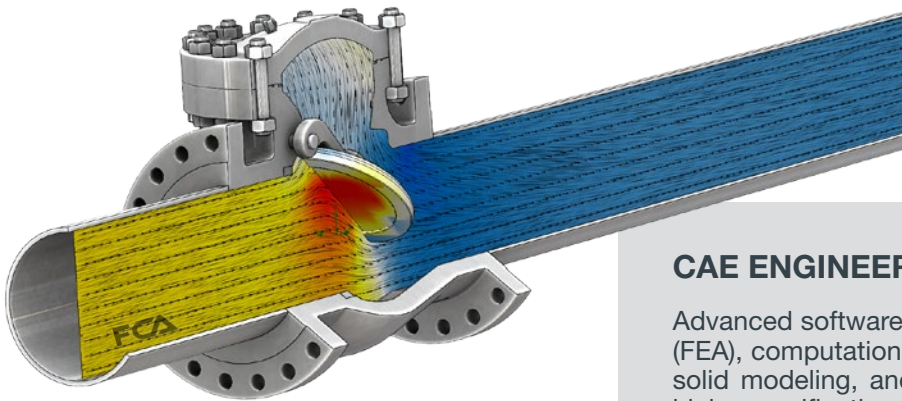
Cv is known as flow coefficient value of a valve. This coefficient Cv is related to the flow and pressure conditions by the following basic liquid equation:

$$Cv=Q*(SG/ \Delta P)^{1/2}$$

It is a relative measure of valves efficiency at allowing fluid flow. Q determines the flow rate (in gpm), SG refers to fluid specific gravity and Pressure drop is considered in psi. It describes the relationship between the pressure drop across the valve and the corresponding flow rate. In more practical terms, the flow coefficient Cv is the volume (in US gallons) of water at 60°F that will flow per minute through a valve with a pressure drop of 1 psi across the valve.

TYPE	CLASS	2"	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"	28"	30"	36"
Full Bore Swing Check Valves	150#	110	250	450	1100	1950	3100	4600	6000	7800	12000	15500	24000	33000	39000	58000
	300#	110	250	450	1100	1950	3100	4600	6000	7800	12000	15500	24000	33000	39000	58000
	600#	100	230	410	1000	1800	3000	4400	5800	7500	11000	14800	22500	32000	37500	56000
	900#	100	230	410	1000	1800	3000	4400	5800	7500	11000	14800	22500	32000	37500	56000
	1500#	80	190	350	890	1700	2850	4150	5500	6800	9200	12500	20000	28000	34000	53000
	2500#	70	165	320	720	1550	2600	3700	5000	5900	7900	9800	16500	23500	30000	46000

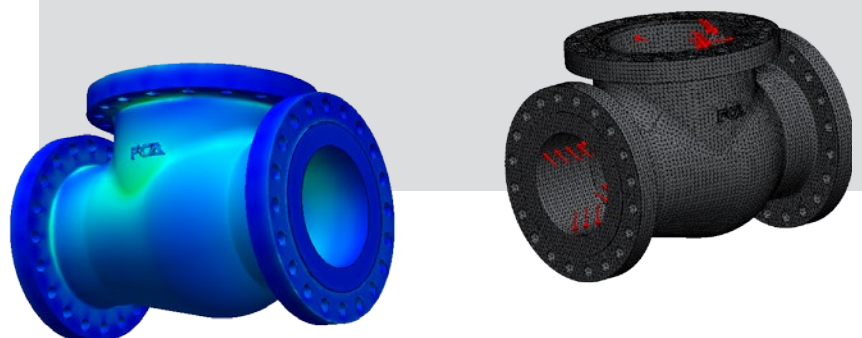
For reference only. Contact FCA for value confirmation.



## CAE ENGINEERING TOOLS

Advanced software applications including Finite Element Analysis (FEA), computational fluid dynamics (CFD) and three-dimensional solid modeling, and our proven know-how, help FCA designing high specification valves to meet most demanded working requirements.

FCA RS and RPS gates valves are engineered to meet high pressure working conditions, up to Class 2500#, considering the most cost effective design. For this aim, parametric studies with finite element analysis are performed by FCA engineering team.

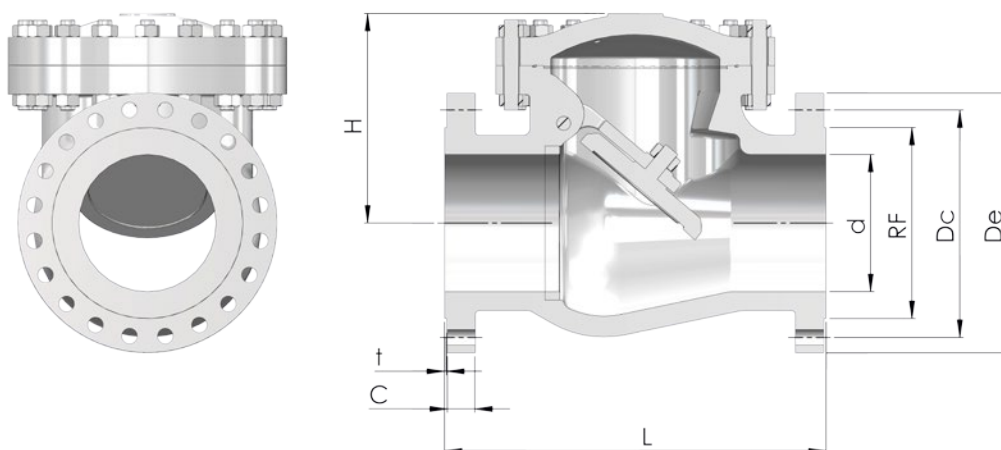


## BOLTED BONNET DESIGN SWING CHECK VALVES - RS MODEL

Standard version available from DN50/2" to DN900/36" and pressure rating up to Class 600#. Face to face according to API 6D.

Drawing double flanged end connection. Contact FCA for specialized drawing according to customer specifications.

Other end connections, sizes and pressures on request.



### DIMENSIONS - CLASS 150#

SIZE		L			d	H	De	Dc	ØRF	Drilling	C	t
NPS	DN	RF	RTJ	BW								
2"	50	292	295	292	50	151	152	120.7	91.9	4-Ø19.1	15.8	1.6
3"	80	356	359	356	76	178	191	152.4	127	4-Ø19.1	19.1	1.6
4"	100	406	410	406	100	190	229	190.5	157.2	8-Ø19.1	23.9	1.6
6"	150	495	498	495	150	228	279	241.3	215.9	8-Ø22.2	25.4	1.6
8"	200	597	600	597	200	292	343	298.5	269.7	8-Ø22.2	28.4	1.6
10"	250	673	676	673	250	304	406	362	323.9	12-Ø25.4	30.2	1.6
12"	300	762	765	762	300	342	483	431.8	381	12-Ø25.4	31.8	1.6
14"	350	889	892	889	336	406	533	476.2	412.8	12-Ø28.6	35.1	1.6
16"	400	902	905	902	387	508	597	539.8	469.9	16-Ø28.6	36.6	1.6
18"	450	1016	1019	1016	438	584	635	577.9	533.4	16-Ø31.8	39.6	1.6
20"	500	1054	1060	1054	488	622	699	635	584.2	20-Ø31.8	42.9	1.6
24"	600	1397	1407	1397	590	711	813	749.3	692.2	20-Ø34.9	47.8	1.6
28"	700	1600	1613	1600	685	838	927	863.6	800.1	28-Ø34.9	71.4	1.6
30"	750	1651	1664	1651	735	889	984	914.4	857.3	28-Ø34.9	74.7	1.6
36"	900	2083	-	2083	875	1092	1168	1085.9	1022.4	32-Ø41.3	90.4	1.6

Notes: Dimensions in (mm). Flange drilling according to ASME B16.5/B16.47

**DIMENSIONS - CLASS 300#**

SIZE			L		d	H	De	Dc	ØRF	Drilling	C	t
NPS	DN	RF	RTJ	BW								
2"	50	267	283	267	50	161	165	127	91.9	8-Ø19.1	22.4	1.6
3"	80	318	333	318	76	203	210	168.3	127	8-Ø22.2	28.4	1.6
4"	100	356	371	356	100	228	254	200.2	157.2	8-Ø22.2	31.8	1.6
6"	150	445	460	445	150	279	318	269.8	215.9	12-Ø22.2	36.6	1.6
8"	200	533	549	533	200	342	381	330.2	269.7	12-Ø25.4	41.1	1.6
10"	250	622	638	622	250	381	445	387.4	323.9	16-Ø28.6	47.8	1.6
12"	300	711	727	711	300	431	521	450.9	381	16-Ø31.8	50.8	1.6
14"	350	838	854	838	336	482	584	514.4	412.8	20-Ø31.8	53.8	1.6
16"	400	864	879	864	387	508	648	571.5	469.9	20-Ø34.9	57.2	1.6
18"	450	978	994	978	438	584	711	628.7	533.4	24-Ø34.9	60.5	1.6
20"	500	1016	1035	1016	488	660	775	685.8	584.2	24-Ø34.9	63.5	1.6
24"	600	1346	1368	1346	590	762	914	812.8	692.2	24-Ø41.3	69.9	1.6
28"	700	1499	1524	1499	685	889	1035	939.8	800.1	28-Ø44.5	85.9	1.6
30"	750	1594	1619	1594	735	977	1092	991	857.3	28-Ø47.6	91.9	1.6
36"	900	2083	-	2083	875	1143	1270	1168.4	1022.4	32-Ø54	104.6	1.6

Notes: Dimensions in (mm). Flange drilling according to ASME B16.5/B16.47

**DIMENSIONS - CLASS 600#**

SIZE			L		d	H	De	Dc	ØRF	Drilling	C	t
NPS	DN	RF	RTJ	BW								
2"	50	292	295	292	50	295	165	127	91.9	8-Ø19.1	25.4	6.4
3"	80	356	569	356	76	359	210	168.3	127	8-Ø22.2	31.8	6.4
4"	100	432	435	432	100	435	273	215.9	157.2	8-Ø25.4	38.1	6.4
6"	150	559	562	559	150	562	356	292.1	215.9	12-Ø28.6	47.8	6.4
8"	200	660	664	660	200	664	419	349.2	269.7	12-Ø31.8	55.6	6.4
10"	250	787	791	787	250	791	508	431.8	323.9	16-Ø34.9	63.5	6.4
12"	300	838	841	838	300	841	559	489	381	20-Ø34.9	66.5	6.4
14"	350	889	892	889	336	892	603	527.1	412.8	20-Ø38.1	69.9	6.4
16"	400	991	994	991	387	994	686	603.2	469.9	20-Ø41.3	76.2	6.4
18"	450	1092	1095	1092	438	1095	743	654.1	533.4	20-Ø44.5	82.6	6.4
20"	500	1194	1200	1194	488	1200	813	723.9	584.2	24-Ø44.5	88.9	6.4
24"	600	1397	1407	1397	590	1407	940	838.2	692.2	24-Ø50.8	101.6	6.4
28"	700	1600	1613	1600	685	1613	1073	965.2	800.1	28-Ø54	111.3	6.4
30"	750	1651	1664	1651	735	1664	1130	1022.4	857.3	28-Ø54	114.3	6.4

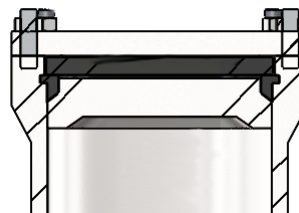
Notes: Dimensions in (mm). Flange drilling according to ASME B16.5/B16.47

## PRESSURE SEAL DESIGN SWING CHECK VALVES - RPS MODEL

Standard version available from DN50/2" to DN750/30" and pressure rating up to Class 2500#. Face to face according to API 6D.

Drawing double flanged end connection. Contact FCA for specialized drawing according to customer specifications.

Other end connections, sizes and pressures on request.



### DIMENSIONS - CLASS 600#

SIZE		L			d	H	De	Dc	ØRF	Drilling	C	t
NPS	DN	RF	RTJ	BW								
2"	50	292	295	292	50	225	165	127	91.9	8-Ø19.1	25.4	6.4
3"	80	356	569	356	76	254	210	168.3	127	8-Ø22.2	31.8	6.4
4"	100	432	435	432	100	279	273	215.9	157.2	8-Ø25.4	38.1	6.4
6"	150	559	562	559	150	368	356	292.1	215.9	12-Ø28.6	47.8	6.4
8"	200	660	664	660	200	393	419	349.2	269.7	12-Ø31.8	55.6	6.4
10"	250	787	791	787	250	457	508	431.8	323.9	16-Ø34.9	63.5	6.4
12"	300	838	841	838	300	584	559	489	381	20-Ø34.9	66.5	6.4
14"	350	889	892	889	336	609	603	527.1	412.8	20-Ø38.1	69.9	6.4
16"	400	991	994	991	387	685	686	603.2	469.9	20-Ø41.3	76.2	6.4
18"	450	1092	1095	1092	438	736	743	654.1	533.4	20-Ø44.5	82.6	6.4
20"	500	1194	1200	1194	488	762	813	723.9	584.2	24-Ø44.5	88.9	6.4
24"	600	1397	1407	1397	590	889	940	838.2	692.2	24-Ø50.8	101.6	6.4
28"	700	1600	1613	1600	685	1066	1073	965.2	800.1	28-Ø54	111.3	6.4
30"	750	1651	1664	1651	735	1168	1130	1022.4	857.3	28-Ø54	114.3	6.4

Notes: Dimensions in (mm). Flange drilling according to ASME B16.5/B16.47

### DIMENSIONS - CLASS 900#

SIZE		L			d	H	De	Dc	ØRF	Drilling	C	t
NPS	DN	RF	RTJ	BW								
2"	50	368	371	368	47	225	216	165.1	91.9	8-Ø25.4	38.1	6.4
3"	80	381	384	381	72	254	241	190.5	127	8-Ø25.4	38.1	6.4
4"	100	457	460	457	98	279	292	235	157.2	8-Ø31.8	44.5	6.4
6"	150	610	613	610	146	381	381	317.5	215.9	12-Ø31.8	55.6	6.4
8"	200	737	740	737	190	533	470	393.7	269.7	12-Ø38.1	63.5	6.4
10"	250	838	841	838	238	558	546	469.9	323.9	16-Ø38.1	69.9	6.4
12"	300	965	968	965	282	609	610	533.4	381	20-Ø38.1	79.2	6.4
14"	350	1029	1038	1029	311	736	641	558.8	412.8	20-Ø41.3	85.9	6.4
16"	400	1130	1140	1130	355	462	705	616	469.9	20-Ø44.5	88.9	6.4
18"	450	1219	1232	1219	400	863	787	685.8	533.4	20-Ø50.8	101.6	6.4
20"	500	1321	1334	1321	444	939	857	749.3	584.2	20-Ø54	108	6.4
24"	600	1549	1568	1549	533	1066	1041	901.7	692.2	20-Ø66.7	139.7	6.4

Notes: Dimensions in (mm). Flange drilling according to ASME B16.5

**DIMENSIONS - CLASS 1500#**

SIZE			L		d	H	De	Dc	ØRF	Drilling	C	t
NPS	DN	RF	RTJ	BW								
2"	50	368	371	368	47	225	216	165.1	91.9	8-Ø25.4	38.1	6.4
3"	80	470	473	470	69	254	267	203.2	127	8-Ø31.8	47.8	6.4
4"	100	546	549	546	92	279	311	241.3	157.2	8-Ø34.9	53.8	6.4
6"	150	705	711	705	136	381	394	317.5	215.9	12-Ø38.1	82.6	6.4
8"	200	832	841	832	177	533	483	393.7	269.7	12-Ø44.5	91.9	6.4
10"	250	991	1000	991	222	558	584	482.6	323.9	12-Ø50.8	108	6.4
12"	300	1130	1146	1130	263	609	673	571.5	381	16-Ø54	124	6.4
14"	350	1257	1276	1257	288	736	749	635	412.8	16-Ø60.3	133.4	6.4
16"	400	1384	1407	1384	330	462	826	704.9	469.9	16-Ø66.7	146.1	6.4
18"	450	1537	1559	1537	371	863	914	774.7	533.4	16-Ø73	162.1	6.4
20"	500	1664	1686	1664	415	939	984	831.9	584.2	16-Ø79.4	177.8	6.4
24"	600	1943	1972	1943	498	1066	1168	990.6	692.2	16-Ø92	203.2	6.4

Notes: Dimensions in (mm). Flange drilling according to ASME B16.5

**DIMENSIONS - CLASS 2500#**

SIZE			L		d	H	De	Dc	ØRF	Drilling	C	t
NPS	DN	RF	RTJ	BW								
2"	50	451	545	451	42	225	235	171.5	91.9	8-Ø28.6	50.8	6.4
3"	80	578	584	578	62	254	305	228.6	127	8-Ø34.9	66.5	6.4
4"	100	673	683	673	87	279	356	273.1	157.2	8-Ø41.3	76.2	6.4
6"	150	914	927	914	131	420	483	368.3	215.9	8-Ø54	108	6.4
8"	200	1022	1038	1022	179	570	552	438.2	269.7	12-Ø54	127	6.4
10"	250	1270	1292	1270	223	1010	673	539.7	323.9	12-Ø66.7	165.1	6.4
12"	300	1422	1445	1422	265	1170	762	619.2	381	12-Ø73	184.2	6.4

Notes: Dimensions in (mm). Flange drilling according to ASME B16.5



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