



TECHNICAL BULLETIN

NAF Setball SF Ball Sector Valves

FCD NFENTB4156-00-AQ 02/16



Experience In Motion

Primary Characteristics

The NAF Setball SF from Flowserve is a highly versatile and cost-effective solution to a range of general services as well as erosive applications such as fibers and slurries.

A V-port ball sector valve designed primarily for modulating control applications, the Setball SF can also be used effectively for shut-off service. It combines a compact design with excellent equal percentage flow characteristics and high flow capacity.

The NAF Setball SF offers the following features to provide durable functionality and greater reliability for increasing process yield and plant uptime:

- A ball sector with a **V-port** resulting in **excellent control characteristic** in combination with **high flow capacity and high rangeability**
- A very **compact** wafer design for weight reduction and cost savings
- A **one-piece, leak-proof** stainless steel valve body to minimize leakage paths
- Enhanced product integrity through a **spring loaded stem seal packing** that provides a long, maintenance free and safe operation
- Dual **low friction bearings** and a **specially designed seat**, resulting in a **smooth operation** and making it possible to use a **small actuator**
- A stem with a **splined transmission** to the ball sector for an **optimum control performance**
- **Direct actuator mounting** capabilities of the NAF Turnex actuator which provides a high performance, vibration resistant, compact valve package
- **Metal seats** with a rigid welded overlay of Alloy 6 to provide a higher leakage resistance over extended periods
- Special **low flow trims** for the smallest size
- Reduced downtime through an **easy-to-service arrangement** which allows for easy replacement of the seat and seat seal without the need for removing the segment and stem and actuator

CE-marked according to Pressure Equipment Directive (PED 97/23/EG) module H, category III. For module H1, category IV contact NAF

Technical specifications for standard design

Material	Stainless steel
Size range	DN 25-250, 1"-10"
Pressure ratings	PN 40/ ANSI Class 300
Face to Face length	Special short face to face acc. to industry standard (see details on page 8)
Valve Design	ANSI B16.34 or EN 12 516
Installation method	Wafer design
Temperature Range	-30 - 250°C, see graph on page 6
Test procedure	Acc. to IEC 60534-4 Hydrostatic test: 1.5 x maximum working pressure Seat leakage test Metal seat: 1.0 x maximum allowed differential pressure with water ¹
Tightness class	Metal seat: IEC 60534-4 Class IV-S1 ²

¹ Gas test upon request ² For liquids in preferred flow direction

Applications

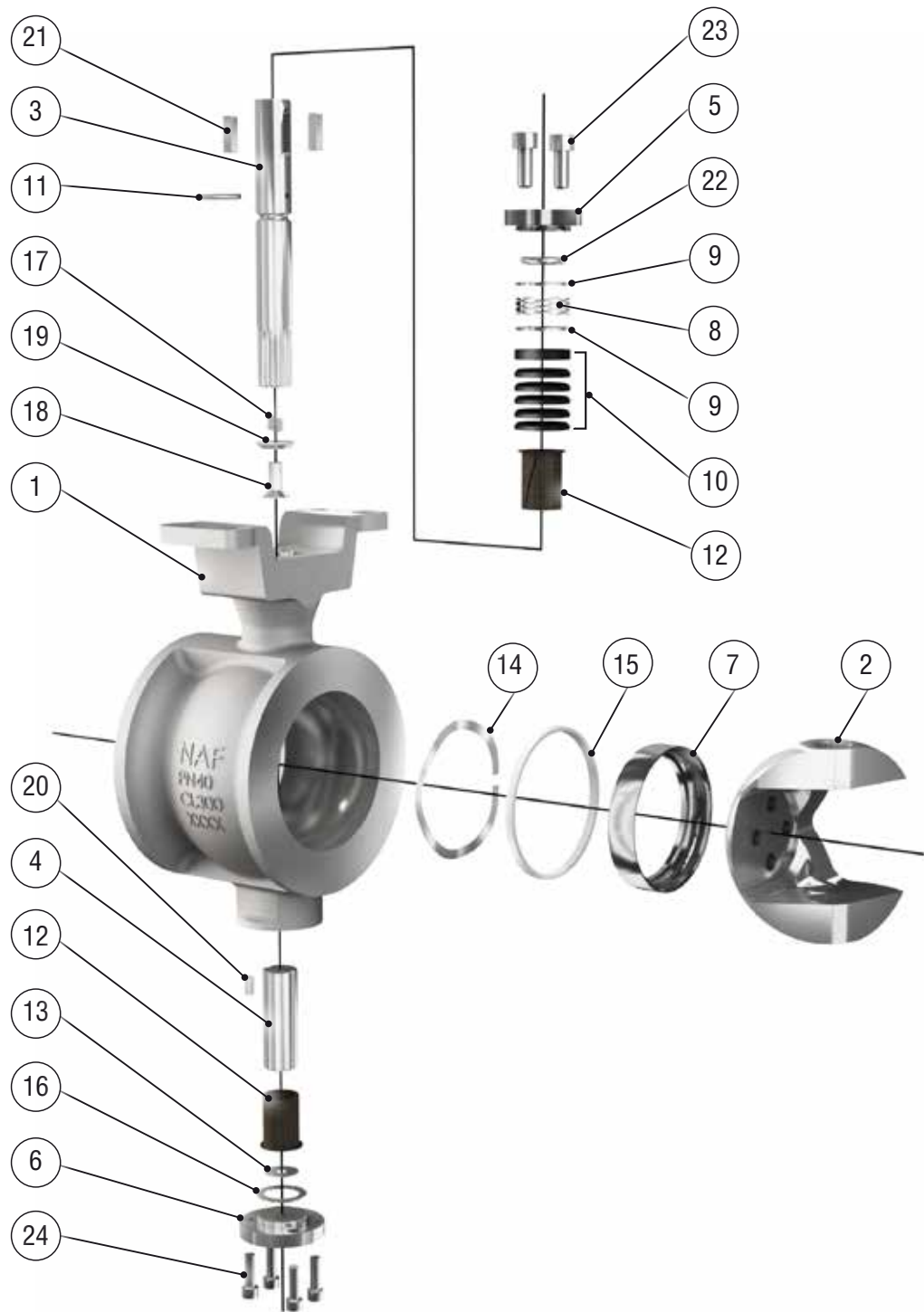
The NAF Setball SF can be used for many general service control applications as well as well as for many applications with particles, fibers, slurries etc. Due to its high flow capability in combination with its compact size, it is a very viable economical alternative also to linear control valves.

NAF Setball SF is recommended for many applications in the following industries:

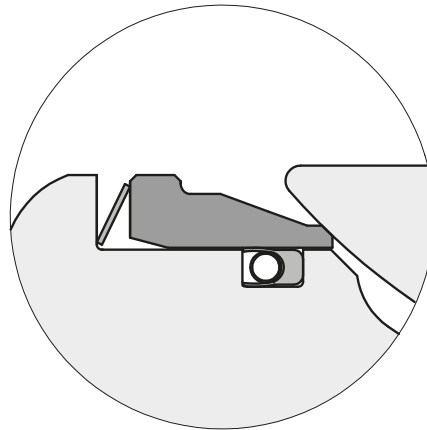
- **Pulp and Paper**
- **Chemical**
- **Metals and Mining**
- **General Industries**



NAF Setball SF



Seat Rings



Metal seat standard

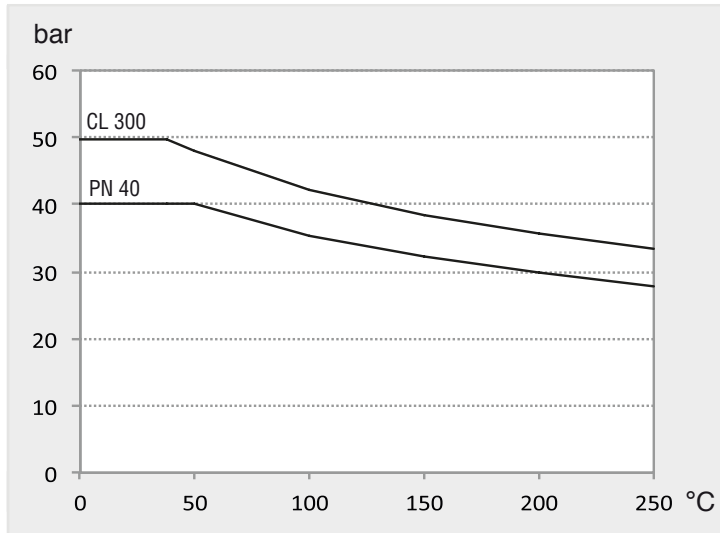
Table 1. Material (metal seated, standard version)

Item	Qty.	Part	Material
1	1	Body	CF8M (~EN1.4408)
2	1	Ball sector	CF8M (~EN1.4408) + Hard Chrome Plated
3	1	Stem, upper	EN1.4460 (type AISI 329)
4	1	Stem, lower	EN1.4460 (type AISI 329)
5	1	Gland cover	CF8M (~EN1.4408)
6	1	Bottom cover	EN1.4470 (Duplex)
7	1	Seat ring	Alloy 6 + stainless steel
8	1	Spring	17-7PH
9	2	Washer	AISI 316L/EN1.4404
10	1	Stem packing	R-PTFE carbon reinforced
11	1	Indicating pin	Stainless steel
12	2	Bushing	PTFE + Stainless steel
13	1	Bearing washer	PTFE + Stainless steel
14	1	Wave spring	17-7PH
15	1	Seat seal	PTFE + Stainless steel
16	1	Gasket	Graphite
17	1	Thread insert	A4
18	1	Screw	A4
19	1	Washer	AISI 316/EN1.4436
20	1	Pin	EN1.4460 (type AISI 329)
21	2	Key	A4
22	2	Locking segment	EN1.4460 (type AISI 329)
23	2	Screw	A4
24	4	Screw	A4

Working Pressure and Temperature

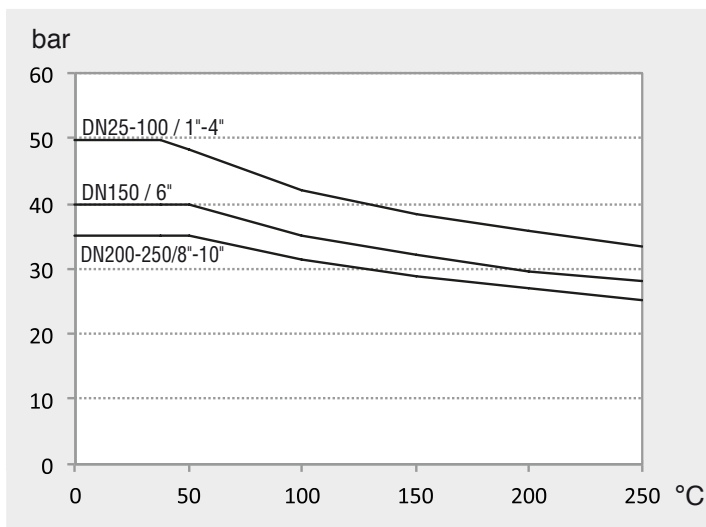
Max. working pressure

Stainless steel body (CF8M)



Differential Pressure and Temperature

Max. dp Alloy 6 seat



Please note that the maximum allowed differential pressure can be further reduced if the maximum allowed working pressure, based on body material and pressure class of the valve, is lower than the maximum allowed differential pressure.

Operating Torque and Flow Capacities

Table 2: Operating torque, Nm

DN	Size	5	10	15	20	25	30	35	40	45	50
25	1"	4	6	8	9	10	11	12	13	14	15
40	1.5"	6	10	12	15	16	17	19	21	22	23
50	2"	8	14	16	20	22	24	26	28	30	32
65	2.5"	10	14	19	23	26	30	32	35	39	42
80	3"	14	18	24	28	32	36	38	41	45	49
100	4"	23	35	48	59	68	79	84	91	101	110
150	6"	54	97	133	163	182	201	221	236		
200	8"	98	160	213	255	282	310	339			
250	10"	145	253	344	419	465	515	567			

The minimum design differential pressure for selecting the actuator is 5 bar.

The specified torques in the table above are for clean media. For steam and with Alloy 6 seat rings increase the required torque by a factor of 1.5.

If the media is a slurry or contains solids etc., consult your NAF representative

Table 3: Flow capacities and characteristics

DN	Size	Flow capacities Kv and Cv at an opening angle of																	
		15°		20°		30°		40°		50°		60°		70°		80°		90°	
		Kv	Cv	Kv	Cv	Kv	Cv	Kv	Cv	Kv	Cv	Kv	Cv	Kv	Cv	Kv	Cv	Kv	Cv
25/05	1T05	0.04	0.05	0.09	0.10	0.24	0.28	0.40	0.46	0.56	0.65	0.75	0.87	0.94	1.09	1.19	1.38	1.52	1.76
25/10	1T10	0.04	0.05	0.1	0.12	0.32	0.37	0.65	0.75	1.3	1.5	2.2	2.6	3.2	3.8	4.5	5.3	6.5	7.5
25/15	1T15	0.2	0.23	0.3	0.35	0.9	1.04	2	2.3	3.3	3.8	4.4	5.1	5.6	6.5	8.3	9.6	11.2	13
25/20	1T20	0.5	0.6	0.7	0.8	1.2	1.4	2.3	2.7	4.1	4.8	7.1	8.2	10.3	11.9	17	20	27	31
40	1.5"	1	1.2	2.1	2.4	4.0	4.6	8	9	13	15	20	23	30	35	46	53	81	94
50	2"	1.6	1.9	3.2	3.7	6	7	14	16	24	28	36	42	55	64	101	117	142	165
65	2.5"	3	3.5	6	7	11	13	22	26	36	42	54	63	81	94	123	143	251	291
80	3"	4	4.6	7	8	16	19	30	35	50	58	75	87	109	126	164	190	305	354
100	4"	9	10	15	17	27	31	56	65	86	100	148	172	193	224	309	358	560	650
150	6"	13	15	24	28	46	53	110	128	179	208	269	312	389	451	545	632	987	1145
200	8"	15	17	35	41	92	107	175	203	285	331	422	490	596	691	857	994	1567	1818
250	10"	21	24	47	55	138	160	264	306	431	500	632	733	879	1020	1249	1449	1923	2231

Dimensions and Weight

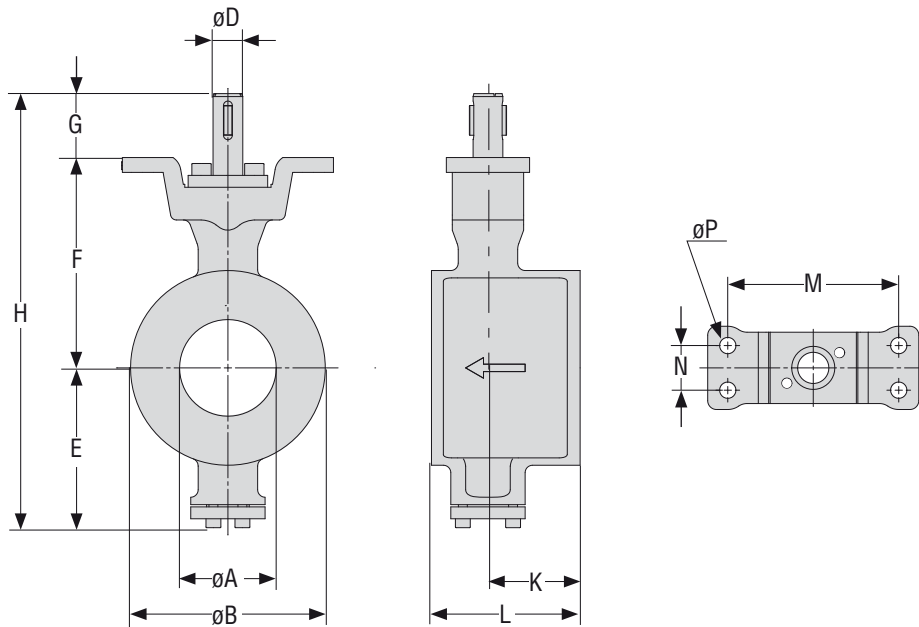


Table 4: Valve dimensions and weight

DN	Size	Dimensions, mm											Weight kg	
		A	B	D	E	F	G	H	K	L	M	N		P
25	1"	21	63	16	67	101	38	206	29	50	115	30	11	2
40	1.5"	33	82	16	72	106	38	216	35	60	115	30	11	3
50	2"	40	100	16	78	112	38	228	46	75	115	30	11	4
65	2.5"	53	119	16	83	116	38	237	60	100	115	30	11	6
80	3"	65	131	20	108	142	43	292	62	100	115	30	11	8
100	4"	80	160	20	120	155	43	317	74	115	115	30	11	10
150	6"	114	216	25	162	203	50	415	105	160	115	30	11	23
200	8"	151	266	25	193	233	50	476	130	200	115	30	11	42
250	10"	176	325	35	240	265	65	570	140	240	160	40	14	70

Actuators

NAF Setball SF is available with worm gears, pneumatic actuators or with electrical actuators and accessories. If other pneumatic or electrical actuators are required, consult your Flowserve NAF representative. The maximum differential pressure for selected actuator and valve is based on torque values in table 2 and is valid for clean media, e.g. water. For steam and other media, please see notes under table 2.

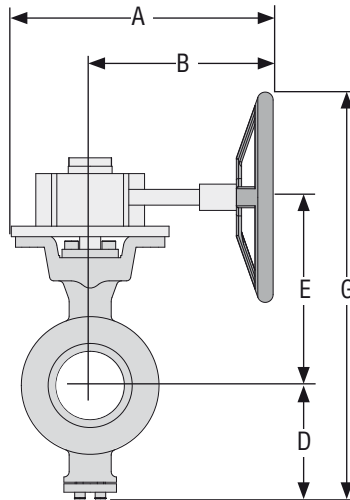


Table 5: NAF Setball SF valves with worm gears

DN	Size	Max. dp bar	NAF No.	Dimensions, mm					Weight kg
				A	B	D	E	G	
Worm gear actuator as per Fk 70.76 ¹⁾									
25	1"	50	791051-11016	249	174	67	139	306	6
40	1.5"	50	791051-11016	249	174	72	144	316	7
50	2"	50	791051-11016	249	174	78	150	328	8
65	2.5"	50	791051-11016	249	174	83	154	337	10
80	3"	50	791051-11020	249	174	108	142	350	12
100	4"	50	791051-11020	249	174	120	193	413	14
150	6"	40	791051-11025	249	174	162	241	503	27
200	8"	35	791051-11025	249	174	193	271	564	46
250	10"	35	791051-22035	328	243	240	313	703	78

¹⁾ Available with locking device. Please contact Flowserve NAF representative

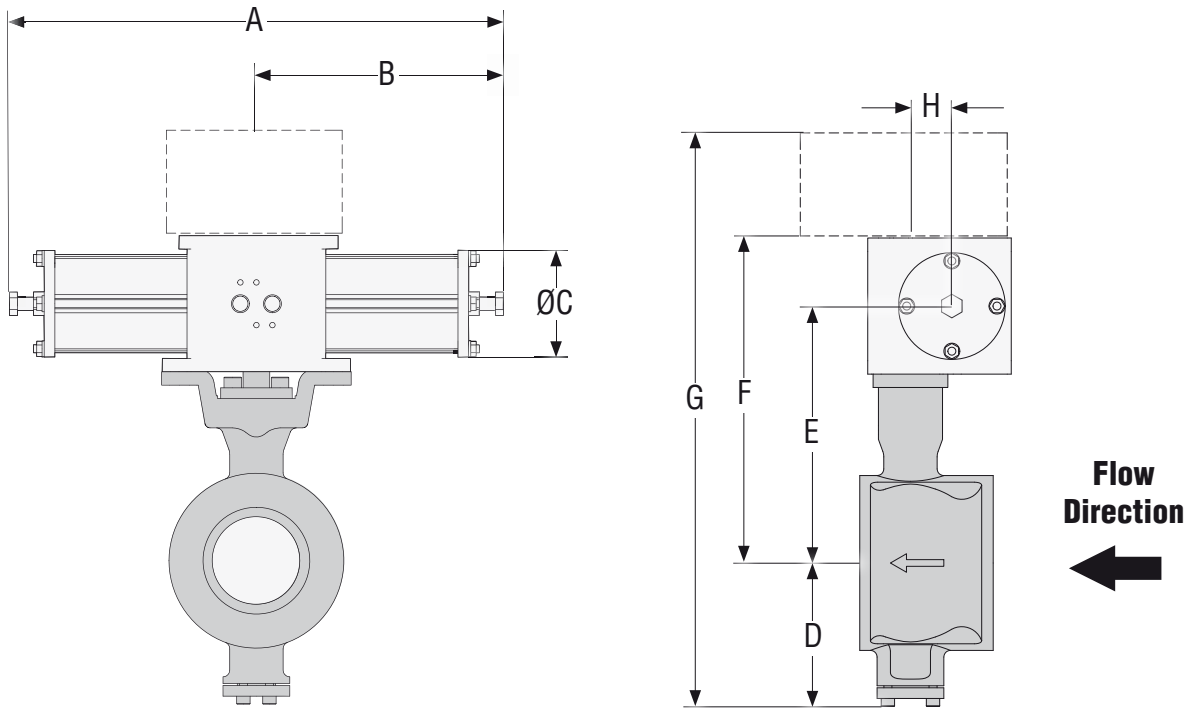


Table 6: NAF Setball valves with NAF Turnex pneumatic actuators (double acting)

The below stated dP apply for clean media type water 20 °C. For other media contact your Flowserve NAF representative, see also page 7.

DN	Size	Max.dP bar at supply of			NAF No.	Dimensions, mm								Weight kg ¹
		4 bar	5 bar	6 bar		A	B	C	D	E	F	G ²	H	
25	1"	50	50	50	791390-0216	370	185	80	67	152	203	380	31	8
40	1.5"	50	50	50	791390-0216	370	185	80	72	157	208	390	31	9
50	2"	50	50	50	791390-0216	370	185	80	78	163	214	402	31	10
65	2.5"	50	50	50	791390-0216	370	185	80	83	167	218	411	31	12
80	3"	50	50	50	791390-0220	370	185	80	108	193	244	461	31	14
100	4"	30	44	50	791390-0220	370	185	80	120	206	257	486	31	16
100	4"	50	50	50	791290-1220	490	245	100	120	211	267	496	40	18
150	6"	7	10	14	791390-0225	370	185	80	162	254	305	577	31	29
150	6"	16	23	30	791290-1225	490	245	100	162	259	315	587	40	31
150	6"	40	40	40	791290-2225	700	350	145	162	278	351	623	63	42
200	8"	8	11	14	791290-1225	490	245	100	193	289	345	648	40	50
200	8"	35	35	35	791290-2225	700	350	145	193	308	381	684	63	61
250	10"	35	35	35	791290-2235	700	350	145	240	340	413	763	63	89

¹ Applies to weight of Setball SF + NAF Turnex actuator + positioner

² Including all direct mounted Flowserve positioners (NAF LinkIT, PMV P5/EP5/D3/D20/D30, Logix 520 MD Plus) that don't require mounting brackets.

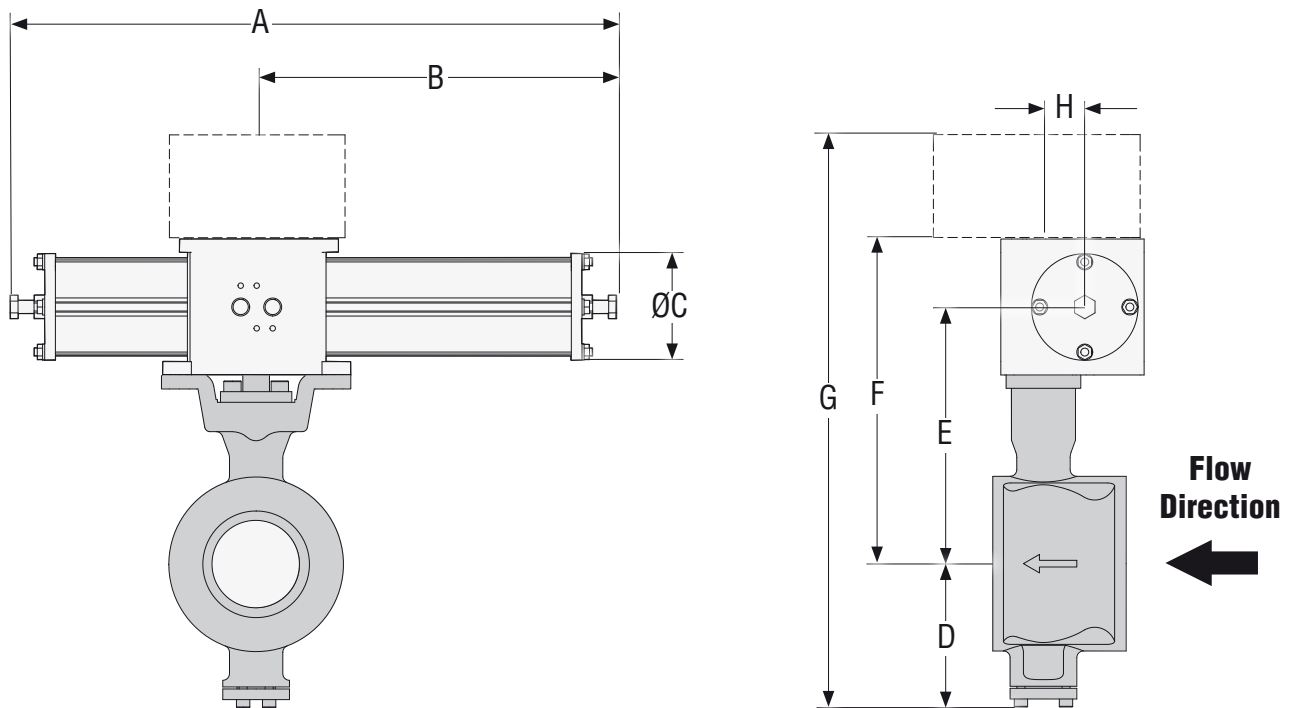


Table 7: NAF Setball SF valves with NAF Turnex pneumatic actuators (spring to close)

The below stated dP apply for clean media type water 20 °C. For other media contact your Flowserve NAF representative, see also page 7.

DN	Size	Max. dP bar at supply of			NAF No.	Dimensions, mm								Weight kg ¹
		4 bar	5 bar	6 bar		A	B	C	D	E	F	G ²	H	
25	1"	50	50	50	791392-0216	455	270	80	67	152	203	380	31	9
40	1.5"	50	50	50	791392-0216	455	270	80	72	157	208	390	31	10
50	2"	50	50	50	791392-0216	455	270	80	78	163	214	402	31	11
65	2.5"	50	50	50	791392-0216	455	270	80	83	167	218	411	31	13
80	3"	45	50	50	791392-0220	455	270	80	108	193	244	461	31	15
100	4"	14	20	20	791392-0220	455	270	80	120	206	257	486	31	17
100	4"	27	40	40	791292-1220	635	390	100	120	211	267	496	40	21
150	6"	7	9	9	791292-1225	635	390	100	162	259	315	587	40	34
150	6"	40	40	40	791292-2225	890	540	145	162	278	351	623	63	50
200	8"	-	5	5	791292-1225	635	390	100	193	289	345	648	40	53
200	8"	32	35	35	791292-2225	890	540	145	193	308	381	684	63	69
250	10"	13	20	20	791292-2235	890	540	145	240	340	413	763	63	97
250	10"	35	35	35	791292-3235	1050	640	200	240	365	457	807	75	115

¹ Applies to weight of Setball SF + NAF Turnex actuator + positioner

² Including all direct mounted Flowserve positioners (NAF LinkIT, PMV P5/EP5/D3/D20/D30, Logix 520 MD Plus) that don't require mounting brackets.

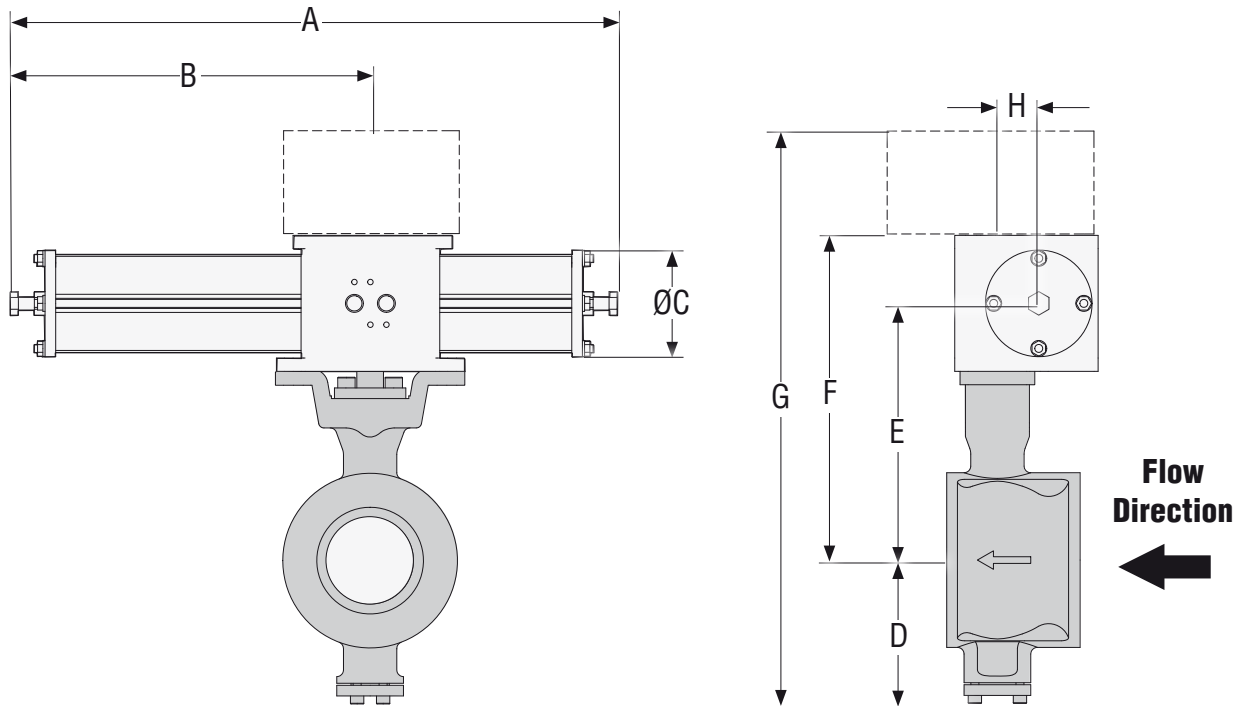


Table 8: NAF Setball SF valves with NAF Turnex pneumatic actuators (spring to open)

The below stated dP apply for clean media type water 20 °C. For other media contact your Flowserve NAF representative, see also page 7.

DN	Size	Max. dP bar at supply of			NAF No.	Dimensions, mm								Weight kg ¹
		4 bar	5 bar	6 bar		A	B	C	D	E	F	G ²	H	
25	1"	50	50	50	791394-0216	455	270	80	67	152	203	380	31	9
40	1.5"	40	50	50	791394-0216	455	270	80	72	157	208	390	31	10
50	2"	22	50	50	791394-0216	455	270	80	78	163	214	402	31	11
65	2.5"	17	50	50	791394-0216	455	270	80	83	167	218	411	31	13
80	3"	12	50	50	791394-0220	455	270	80	108	193	244	461	31	15
100	4"	4	17	27	791394-0220	455	270	80	120	206	257	486	31	17
100	4"	8	35	50	791294-1220	635	390	100	120	211	267	496	40	21
150	6"	-	6	11	791294-1225	635	390	100	162	259	315	587	40	34
150	6"	18	40	40	791294-2225	890	540	145	162	278	351	623	63	50
200	8"	-	4	6	791294-1225	635	390	100	193	289	345	648	40	53
200	8"	9	35	35	791294-2225	890	540	145	193	308	381	684	63	69
250	10"	4	17	29	791294-2235	890	540	145	240	340	413	763	63	97
250	10"	25	35	35	791294-3235	1050	640	200	240	365	457	807	75	115

¹ Applies to weight of Setball SF + NAF Turnex actuator + positioner

² Including all direct mounted Flowserve positioners (NAF LinkIT, PMV P5/EP5/D3/D20/D30, Logix 520 MD Plus) that don't require mounting brackets.

Actuators

The pneumatic actuators NAF Turnex can be directly mounted to the NAF Setball SF without any couplings or brackets. Together with the direct mounting capabilities of all NAF positioners and several of the Flowserve positioners (PMV P5/EP5, PMV D3/D20/D30 and Logix 520 MD+), this provides a high performance, vibration resistant and compact valve package suitable for precision control.

Please see data sheet for further information on the NAF Turnex actuator capabilities and all other available accessories.

Product Code for NAF Setball SF

Example:

85 8 0 E S - 0100 - BAB A E A
Code 1 2 3 4 5 6 7 8 9 10

- | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>1. Valve type
85 NAF Setball SF</p> <p>2. Material
8 CF8M (~EN 1.4408)</p> <p>3. Pressure rating
0 PN 40/ANSI Class 300</p> <p>4. Stem bearing
E PTFE+ stainless steel</p> <p>5. Body type
S Wafer, special short face-to-face according to Industry standard</p> <p>6. Size</p> | <p>8. Seat seal
A R-PTFE, carbon reinforced, max t=250 °C</p> <p>9. Stem seal
E Spring loaded R-PTFE V-rings, carbon reinforced</p> <p>10. Stem material
A Duplex EN 1.4460 (~AISI 329)</p> |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Versions marked with bold text and are the standard versions with shortest leadtime.

PN ratings		ANSI ratings	
	DN		Size
2505	25/5	1T05	1"/5
2510	25/10	1T10	1"/10
2515	25/15	1T15	1"/15
2520	25/20	1T20	1"/20
0040	40	01.5	1,5"
0050	50	0002	2"
0065	65	02.5	2,5"
0080	80	0003	3"
0100	100	0004	4"
0150	150	0006	6"
0200	200	0008	8"
0250	250	0010	10"

7. Seat, ball and ball sector overlay

BAB	Seat	Ball sector	Overlay
	Alloy 6	CF8M / 316	Hard Chrome
	overlay/SS	(~EN 1.4408)	

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NFENTB4156-01-AQ 02/2016

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