

Neles™ soft seated ball valves

Trunnion supported, full bore, series 6D

Neles™ series 6D is an API 6D certified (cert. no. 6D-1529) full bore trunnion ball valve. The valve incorporates industry proven technology for body, ball, stem, stuffing box and seat designs. Packed with features, these piggable valves deliver long-lasting performance in isolation service. Valve modularity widens the options in material and operator selections to meet application specific requirements. Application based trim selection ensures the valve can serve even in demanding conditions. Valve series meets the latest industry requirements concerning safety and emissions.

Applications

- Hydrocarbons
- Oil and gas (up-stream and mid-stream)
- Pipelines
- Chemical and petrochemical plants
- Emergency valves ESD/ESV/HIPPS
- Other general process industries

Size range

- NPS 2 – 24 / DN 50 – 600, full bore

Pressure classes

- ASME Class 150 and 300 (higher class rating on request)

Seat tightness

- Bubble tight with no visible leakage under full differential pressure as per API 6D, API 598, ISO 5208 Rate-A
- Suitable for vacuum service

Features

- 3 mm added wall thickness as standard for longevity and enhanced corrosion protection
- Robust body and bolting complying to ASME Section VIII pressure vessel code and ASME B16.34 for maximum structural integrity
- Dowel pins and keys provided to avoid bolts being subjected to combined torsional/bending loads in body, stem housing, trunnion, and stuffing box
- Fully machined valve internal surfaces for reduced flow induced frictional losses (fully piggable valve)
- Cavity vent port and bottom drain port in body as standard feature



- Dual body seal with primary O-ring and secondary graphite gasket for excellent performance when subjected to thermal shocks (in-service temperature & pressure excursions, event of fire, etc.)
- One-piece solid mirror finished ball with internal relief hole to avoid cavity over pressurization in valve open condition
- Spring loaded single piston effect seat (SPE) with double block and bleed (DBB) design that absorbs pressure and thermal shocks, wear, and provides a long service life
- DBB seats allows venting of the body cavity in closed position
- Self-relieving Primary Soft Secondary Metal seat (PSSM) design with double barrier O-ring and graphite seal to prevent solids entrapment/accumulation and provide excellent Fire-Tite™ performance
- Nickel alloy (Inconel X-750) helical springs behind seat ensures uniform & consistent seat leak tightness even in low pressure
- Corrosion resistant rugged trunnion secured with pins & low friction bearings ensure precise guiding of ball during valve operation
- Emergency seat and stem sealant injection
- Anti-static arrangement between ball-stem and stem-body
- Single piece, internal entry stem, blow-out proof, and precision guided with polymer and graphite thrust washer (for Fire-Tite™ performance) & internal bushings which handle side loading
- Engineered mounting hardware with high strength coupler & guide bearing for near perfect torque transmission for various types of actuators (including API 6DX compliant)

Options

- Optional weld overlay on wetted area
O-ring sealing surfaces in carbon & alloy steel valves to resist corrosion

Full bore

- Maximum Cv per nominal size / Full bore design for API 6D requirements
- Cylindrical flow path with low flow resistance
- Piggable

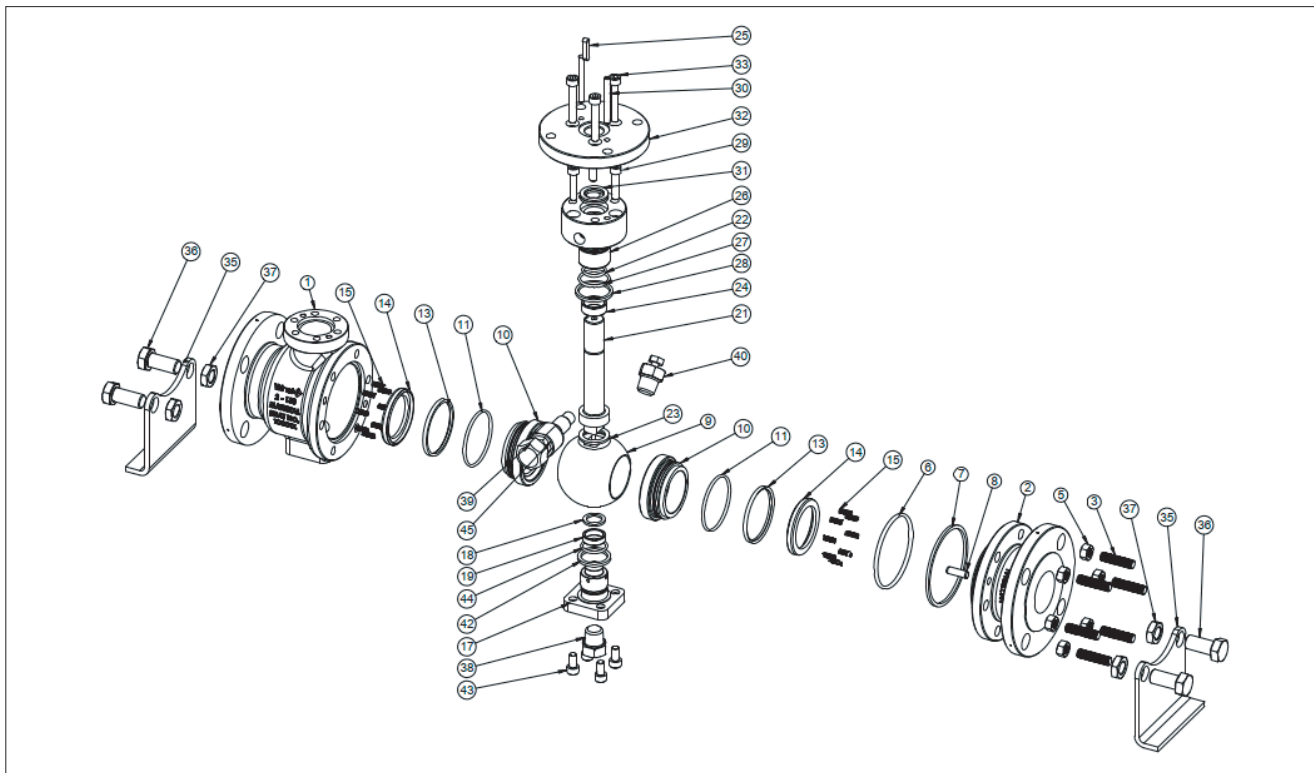
Reduced emissions

- Off-center body joint provides:
 - Uninterrupted circular O-ring and graphite gasket
 - No bending forces from pipeline to gland packing for lowest emissions

- Encapsulated single piece gland compression plate prevents external dirt ingress and provides corrosion protection
- Triple barrier stem seal assures long operating life, low emission levels, and online gland packing replacement
 - Internal pressure energized sandwich stem thrust washer (Fluoropolymer + Graphite)
 - O-rings
 - Graphite packing

Exploded view and parts list

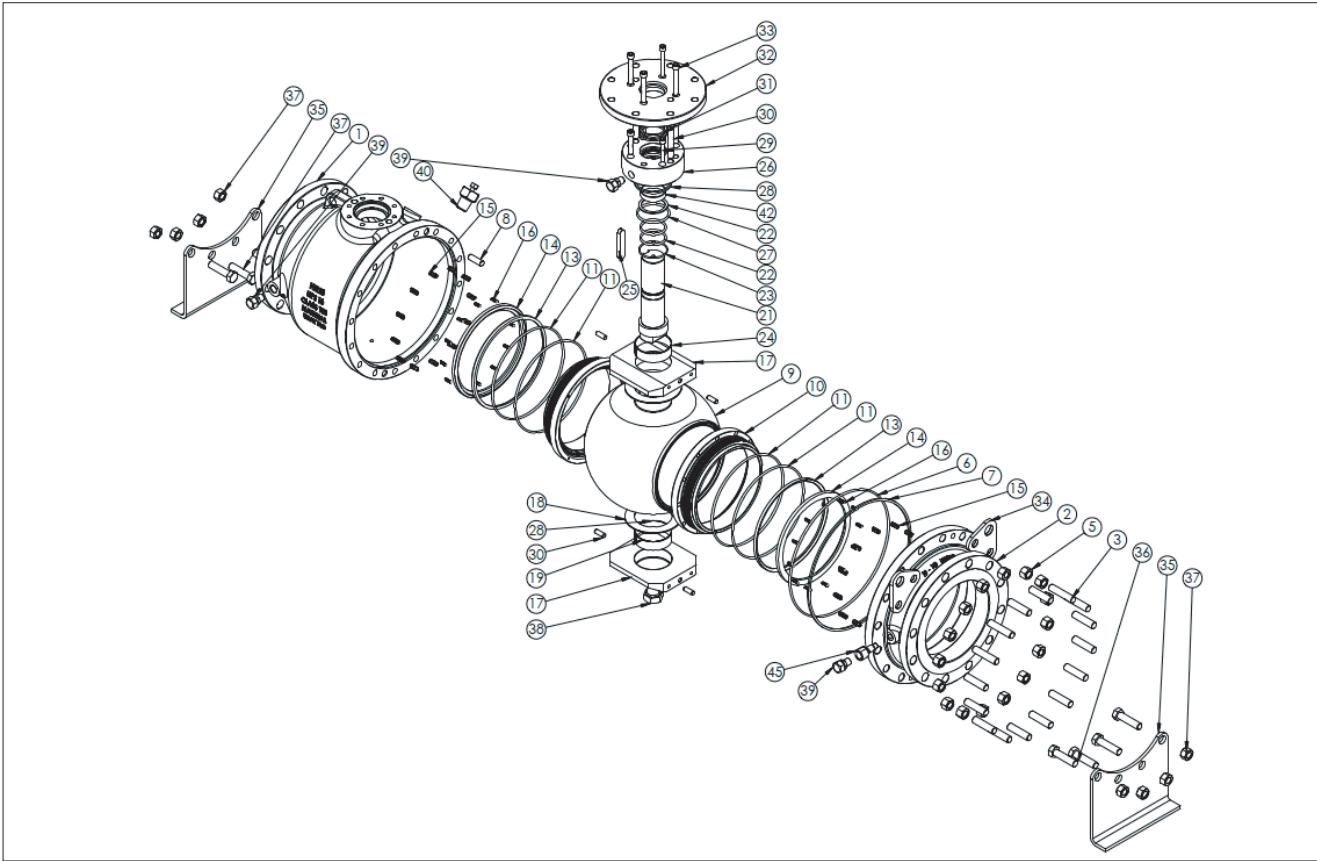
NPS 2 & 3 ASME Class 150 & 300



Item	Part Description	Material	
		Carbon steel	Stainless steel
1	Body	ASTM A216 Gr. WCB	ASTM A351 Gr. CF8M
2	Body cap	ASTM A216 Gr. WCB	ASTM A351 Gr. CF8M
3	Stud	ASTM A193 Gr. B7	ASTM A193 Gr. B8M
5	Heavy Hex Nut	ASTM A194 Gr. 2H	ASTM A194 Gr. 8M
6	O-ring		Fluoroelastomer (FKM)
7	Gasket		Graphite
8	Dowel Pin		AISI 4140
9	Ball	ASTM A105 + ENP coating	316 SS
10	Seat	Reinforced PTFE with metal backing (ASTM A105 + ENP coating)	Reinforced PTFE with metal backing (316 SS)
11	O-Ring		Fluoroelastomer (FKM)
13	Seat Gasket		Graphite
14	Seat Retainer	ASTM A105 + ENP coating	316 SS
15	Spring	Inconel X-750	
17	Trunnion	ASTM A105	316 SS
18	Thrust Washer		AISI 316 + PTFE
19	Bearing		AISI 316 + PTFE
21	Stem	13% Chrome steel	17-4 PH steel
22	O-Ring		Fluoroelastomer (FKM)
23	Thrust Washer (Stem seal)		Fluoropolymer + Graphite
24	Bearing		AISI 316 + PTFE
25	Key		AISI 329
26	Stem Housing (Bonnet)	ASTM A105	ASTM A182 Gr. F316
27	O-Ring		Fluoroelastomer (FKM)
28	Gasket		Graphite
29	Cap Screw	ASTM A193 Gr. B7	ASTM A193 Gr. B8M
30	Dowel Pin		AISI 4140
31	Gland Packing		Graphite
32	Mounting Flange (Gland)	ASTM A105	ASTM A182 Gr. F316
33	Cap Screw	ASTM A193 Gr. B7	ASTM A193 Gr. B8M
35	Mounting Stand		Coated steel
36	Bolt		Coated steel
37	Nut		Coated steel
38	Drainage Connection		316 SS
39	Grease Fitting		316 SS
40	Bleeder Valve		316 SS
42	Gasket		Graphite
43	Cap Screw	ASTM A193 Gr. B7	ASTM A193 Gr. B8M
44	O-ring		Fluoroelastomer (FKM)
45	Connector		316 SS

Note: NACE compliant Carbon steel valve will have ASTM A193 Gr. L7M & ASTM A194 Gr. 7M bolting

NPS 4 to 24 ASME Class 150 & 300



Item	Part Description	Material	
		Carbon steel	Stainless steel
1	Body	ASTM A216 Gr. WCB	ASTM A351 Gr. CF8M
2	Body cap	ASTM A216 Gr. WCB	ASTM A351 Gr. CF8M
3	Stud	ASTM A193 Gr. B7	ASTM A193 Gr. B8M
5	Heavy Hex Nut	ASTM A194 Gr. 2H	ASTM A194 Gr. 8M
6	O-ring		Fluoroelastomer (FKM)
7	Gasket		Graphite
8	Dowel Pin		AISI 4140
9	Ball	ASTM A105 + ENP coating	316 SS
10	Seat	Reinforced PTFE with metal backing (ASTM A105 + ENP coating)	Reinforced PTFE with metal backing (316 SS)
11	O-Ring		Fluoroelastomer (FKM)
13	Seat Gasket		Graphite
14	Seat Retainer	ASTM A105 + ENP coating	316 SS
15	Spring		Inconel X-750
16	Spring		Inconel X-750
17	Trunnion (Trunnion plate)	ASTM A105	316 SS
18	Thrust Washer		AISI 316 + PTFE
19	Bearing		AISI 316 + PTFE
20	Dowel Pin		AISI 4140
21	Stem	13% Chrome steel	17-4 PH steel
22	O-Ring		Fluoroelastomer (FKM)
23	Thrust Washer (Stem seal)		Fluoropolymer + Graphite
24	Bearing		AISI 316 + PTFE
25	Key		Fluoroelastomer (FKM)
26	Stem Housing (Bonnet)	ASTM A105	ASTM A182 Gr. F316
27	O-Ring		Fluoroelastomer (FKM)
28	Gasket		Graphite
29	Cap Screw	ASTM A193 Gr. B7	ASTM A193 Gr. B8M
30	Dowel Pin		AISI 4140
31	Gland Packing		Graphite
32	Mounting Flange (Gland)	ASTM A105	ASTM A182 Gr. F316
33	Cap Screw	ASTM A193 Gr. B7	ASTM A193 Gr. B8M
34	Lifting Hook		Coated steel
35	Mounting Stand		Coated steel
36	Bolt		Coated steel
37	Nut		Coated steel
38	Drainage Connection		316 SS
39	Grease Fitting		316 SS
40	Bleeder Valve		316 SS
45	Connector		316 SS

Note: NACE compliant Carbon steel valve will have ASTM A193 Gr. L7M & ASTM A194 Gr. 7M bolting

Technical specification

Product type

Full bore valve
Trunnion supported ball design
Off-center split body design

Pressure ratings

ASME 150 and 300 (larger class rating on request)

Size range

NPS 2 – 24 / DN 50 – 600

Temperature range

-29 °C...+200 °C / -20 °F...+392 °F

Design standards

Valve body	API 6D, ASME B16.34
Valve flanges	ASME B16.5
Face-to-face	API 6D, ASME B16.10 long pattern
Actuator mount	ISO 5211
Fire safe	API 607 (8th edition) & ISO 10497:2022
Fugitive emissions	ISO 15848

Standard materials

Body:	WCB or CF8M
Ball:	A105 + ENP coating or AISI 316
Bearings:	AISI 316 + PTFE
Seats:	Reinforced PTFE
Seals/gaskets:	O-ring/Graphite
Body gasket:	Graphite
Gland packing:	O-ring + Graphite
Bolting:	B7/2H or B8M/8M

Material and test certification

EN 10204-3.1 material certificates for body and bonnet
Valve pressure test and seat leak tightness report

Standards & options

CE marked for PED & ATEX as standard
Anti-static as standard
NACE MR 0175 (Optional)
API 6D monogram (Optional)

Valve testing

Each valve is tested for body integrity and seat tightness as per API 6D, API 598, ISO 5208.

The body test pressure is 1.5 x rated pressure at ambient temperature.

The seat test pressure is 1.1 x rated pressure at ambient temperature.

The test medium is corrosion inhibited water.

Air seat leak test as standard.

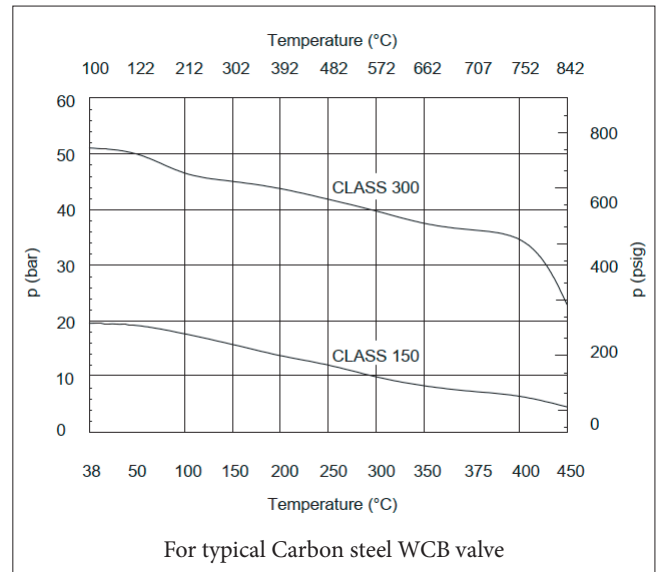
Valve tightness

All versions are with no visible leakage as per API 6D, API 598, ISO 5208 Rate-A.

Optional tests

Cavity over pressure test, Double block & bleed test, Low pressure air seat leak test, Anti-static test, etc. as per API 6D

Maximum allowable ΔP in on-off service



(Note: Valve suitable for use between -29°C to +200°C)

Actuator selection

6D series valve can be equipped with the following Neles™ actuator types:

1. N1 Pneumatic double acting or spring return actuator (including API 6DX compliant version)
2. B1C/B1J series pneumatic double acting or spring return actuator
3. Manual gear operator
4. Hand lever

When selecting other actuators, please contact your local Valmet representative.

For the correct actuator selection in on-off service, the following process data are mandatory:

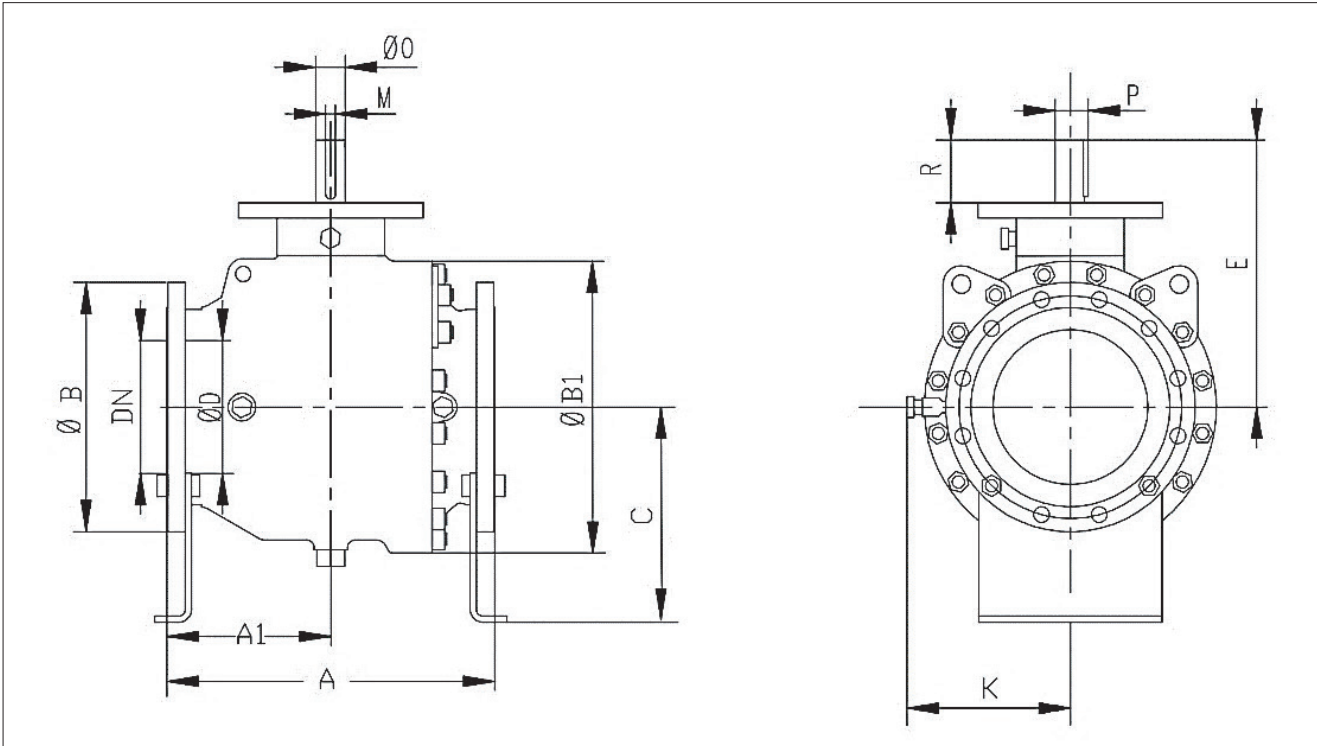
- valve size, pressure class, seat type
- gland packing type
- maximum shut-off pressure across the valve
- supply pressure for the actuator

Note:

Each valve can be application specific, many factors should be considered when selecting a valve for a given application. Therefore, some of the applications in which the valves are used are outside the scope of this document. If you have any questions concerning the use, application or compatibility of the valve with the intended service, contact nearest Valmet sales office for more information.

Dimensions & weight

Bare valve



Note: Valve face-to-face dimension acc. to API 6D, Table C.2.

SI units

ASME Class 150

NPS	DIMENSIONS, mm												WEIGHT kg
	A	A1	ØB	ØB1	C	ØD	E	K	M	ØO	P	R	
2	178	84	152	136.5	203	49	172	125	6	22	24.5	34	21
3	203	94.5	190	180	225	74	206.5	170	12	30	33	43.5	37
4	229	114.5	229	230	296	100	243	170	10	38	41	55	53
6	394	197	279	324	373	150	292.5	170	14	45	48.5	62.5	153
8	457	228.5	343	403	453	201	381	250	18	60	64	80	257
10	533	266.5	406	475	562	252	437.5	275	18	64	68	105	380
12	610	305	483	566	605	303	489	345	20	73	77.5	114	575

ASME Class 300

NPS	DIMENSIONS, mm												WEIGHT kg
	A	A1	ØB	ØB1	C	ØD	E	K	M	ØO	P	R	
2	216	103	165	136.5	116	49	172	125	6	22	24.5	34	25
3	283	137.5	210	190	182	74	206.5	170	12	30	33	43.5	52
4	305	142.5	254	236	156	100	243	170	10	38	41	55	76
6	403	201.5	318	338	228.5	150	292.5	170	14	45	48.5	62.5	182
8	502	251	381	420	315	201	381	280	18	60	64	80	340
10	568	284	444	490	360	252	437.5	310	18	64	68	105	460
12	648	324	521	587	410	303	489	350	20	73	77.5	114	690

Imperial units

ASME Class 150

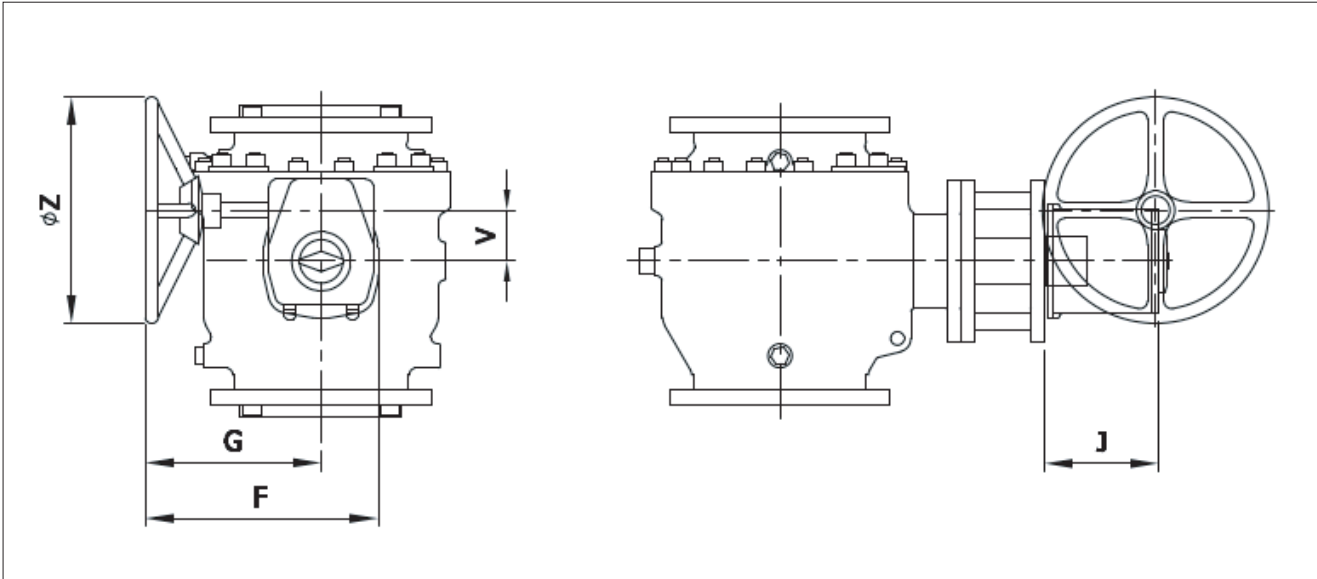
NPS	DIMENSIONS, inch												WEIGHT lbs
	A	A1	ØB	ØB1	C	ØD	E	K	M	ØO	P	R	
2	7.01	3.31	5.98	5.37	7.99	1.93	6.77	4.92	0.24	0.87	0.96	1.34	46
3	7.99	3.72	7.48	7.09	8.86	2.91	8.13	6.69	0.47	1.18	1.30	1.71	81
4	9.02	4.51	9.02	9.06	11.65	3.94	9.57	6.69	0.39	1.50	1.61	2.17	116
6	15.51	7.76	10.98	12.76	14.69	5.91	11.52	6.69	0.55	1.77	1.91	2.46	337
8	17.99	9.00	13.50	15.87	17.83	7.91	15.00	9.84	0.71	2.36	2.52	3.15	566
10	20.98	10.49	15.98	18.70	22.13	9.92	17.22	10.83	0.71	2.52	2.68	4.13	837
12	24.02	12.01	19.02	22.28	23.82	11.93	19.25	13.58	0.79	2.87	3.05	4.49	1267

ASME Class 300

NPS	DIMENSIONS, inch												WEIGHT lbs
	A	A1	ØB	ØB1	C	ØD	E	K	M	ØO	P	R	
2	8.50	4.06	6.50	5.37	4.57	1.93	6.77	4.92	0.24	0.87	0.96	1.34	55
3	11.14	5.41	8.27	7.48	7.17	2.91	8.13	6.69	0.47	1.18	1.30	1.71	114
4	12.01	5.61	10.00	9.29	6.14	3.94	9.57	6.69	0.39	1.50	1.61	2.17	167
6	15.87	7.93	12.52	13.31	9.00	5.91	11.52	6.69	0.55	1.77	1.91	2.46	401
8	19.76	9.88	15.00	16.54	12.40	7.91	15.00	11.02	0.71	2.36	2.52	3.15	749
10	22.36	11.18	17.48	19.29	14.17	9.92	17.22	12.20	0.71	2.52	2.68	4.13	1014
12	25.51	12.76	20.51	23.11	16.14	11.93	19.25	13.78	0.79	2.87	3.05	4.49	1521

Valve with manual operator

MGR Series



Note: Standard mounting hardware between valve & operator complies with API 6DX

SI units

ASME Class 150

NPS	Gear	Dimensions, mm						kg
		F	G	J	V	ϕZ	K	
2	MGR 5/QA	255	226	56	42	102	228	27
3	MGR 5/QA	255	226	56	42	102	280	35
4	MGR7/QA	268	217	61	52	200	300	64
6	MGR10/QA	303	252	61	52	305	410	170
8	MGR12/QA	369	304	87	71	508	450	300
10	MGR14/QA	381	306	92	86	813	490	432
12	MGR14/QA	381	306	92	86	813	555	650

ASME Class 300

NPS	Gear	Dimensions, mm						kg
		F	G	J	V	ϕZ	K	
2	MGR5/QA	255	226	56	42	102	228	31
3	MGR7/QA	268	217	61	52	200	280	62
4	MGR10/QA	303	252	61	52	305	300	87
6	MGR14/QA	381	306	92	86	813	410	209
8	MGR14/QA	381	306	92	86	813	450	388
10	MGR15/QA	437	346	103	104	813	490	520
12	MGR16/QA	422	348	119	53	813	555	775

Imperial units

ASME Class 150

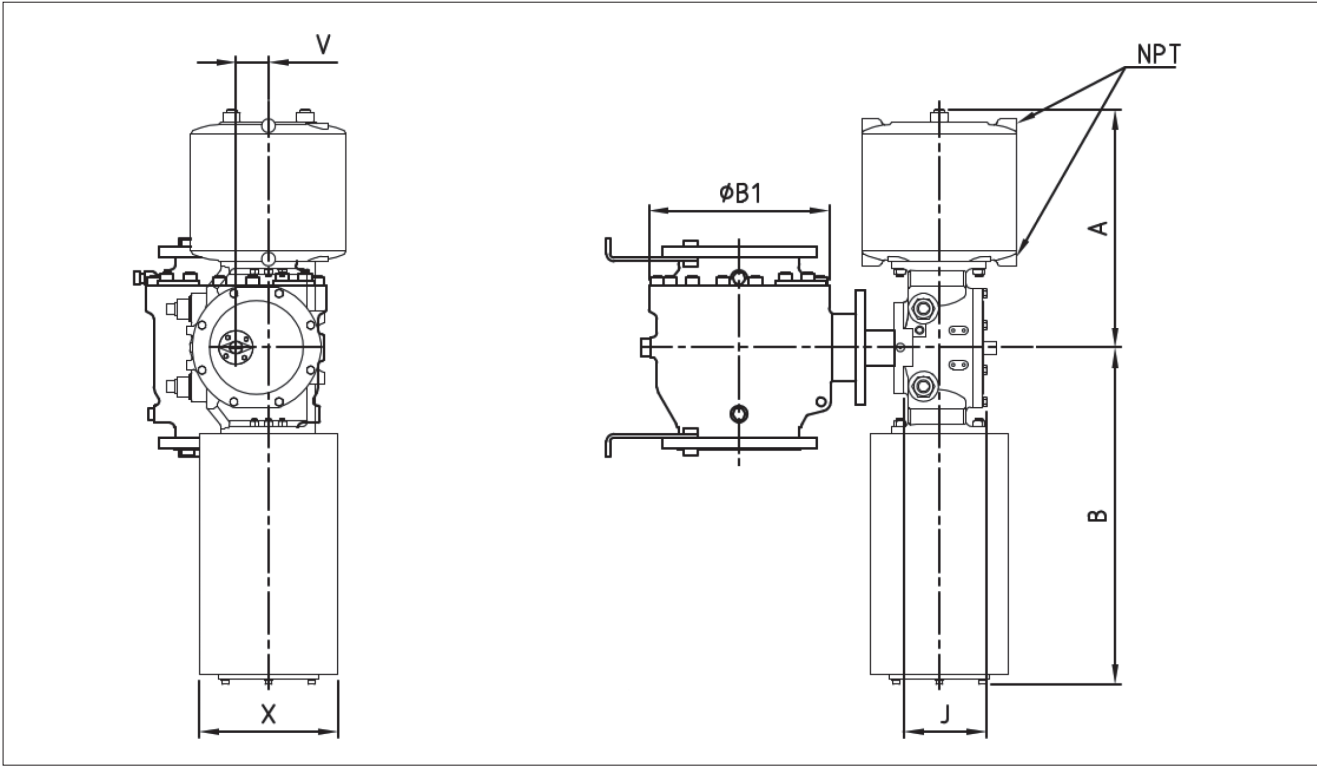
NPS	Gear	Dimensions, inch						lbs
		F	G	J	V	øZ	K	
2	MGR 5/QA	10.04	8.90	2.20	1.65	4.02	8.98	60
3	MGR 5/QA	10.04	8.90	2.20	1.65	4.02	11.02	77
4	MGR7/QA	10.55	8.54	2.40	2.05	7.87	11.81	141
6	MGR10/QA	11.93	9.92	2.40	2.05	12.01	16.14	375
8	MGR12/QA	14.53	11.97	3.43	2.80	20.00	17.72	662
10	MGR14/QA	15.00	12.05	3.62	3.39	32.01	19.29	953
12	MGR14/QA	15.00	12.05	3.62	3.39	32.01	21.85	1433

ASME Class 300

NPS	Gear	Dimensions, inch						lbs
		F	G	J	V	øZ	K	
2	MGR5/QA	10.04	8.90	2.20	1.65	4.02	8.98	68
3	MGR7/QA	10.55	8.54	2.40	2.05	7.87	11.02	137
4	MGR10/QA	11.93	9.92	2.40	2.05	12.01	11.81	192
6	MGR14/QA	15.00	12.05	3.62	3.39	32.01	16.14	461
8	MGR14/QA	15.00	12.05	3.62	3.39	32.01	17.72	856
10	MGR15/QA	17.20	13.62	4.06	4.09	32.01	19.29	1147
12	MGR16/QA	16.61	13.70	4.69	2.09	32.01	21.85	1709

*Weight of entire assembly

Valve with pneumatic actuator
N1 series (Spring return)



Note: Standard mounting hardware between valve & actuator complies with API 6DX

SI units

ASME Class 150

NPS	Actuator	Dimensions, mm					WEIGHT *kg
		A	B	V	X	NPT	
2	N1X 0100 E1	257	365	28	170	1/4	74
3	N1A 0100 E11	385	498	58	255	1/4	200
4	N1A 0150 E9	395	498	58	255	3/8	235
6	N1A 0250 E6	413	573	58	310	1/2	390
8	N1A 0300 E4	456	612	58	360	3/4	577
10	N1B 0350 E3	551	955	75	321	3/4	807
12	N1C 0400 E3	660	1060	90	379	3/4	1223

ASME Class 300

NPS	Actuator	Dimensions, mm					WEIGHT *kg
		A	B	V	X	NPT	
2	N1A 0100 E11	385	498	58	255	1/4	172
3	N1A 0150 E9	395	498	58	255	3/8	210
4	N1A 0250 E6	413	573	58	310	1/2	267
6	N1A 0300 E4	456	612	58	360	3/4	410
8	N1B 0350 E3	551	955	75	321	3/4	675
10	N1C 0400 E3	660	1060	90	379	3/4	984
12	N1C 0500 E2	675	1060	90	379	3/4	1290

Imperial units

ASME Class 150

NPS	Actuator	Dimensions, inch					WEIGHT *lbs
		A	B	V	X	NPT	
2	N1X 0100 E1	10.12	14.37	1.10	6.69	1/4	163
3	N1A 0100 E11	15.16	19.61	2.28	10.04	1/4	440
4	N1A 0150 E9	15.55	19.61	2.28	10.04	3/8	518
6	N1A 0250 E6	16.26	22.56	2.28	12.20	1/2	859
8	N1A 0300 E4	17.95	24.09	2.28	14.17	3/4	1272
10	N1B 0350 E3	21.69	37.60	2.95	12.64	3/4	1779
12	N1C 0400 E3	25.98	41.73	3.54	14.92	3/4	2696

ASME Class 300

NPS	Actuator	Dimensions, inch					WEIGHT *lbs
		A	B	V	X	NPT	
2	N1A 0100 E11	15.16	19.61	2.28	10.04	1/4	78
3	N1A 0150 E9	15.55	19.61	2.28	10.04	3/8	95
4	N1A 0250 E6	16.26	22.56	2.28	12.2	1/2	121
6	N1A 0300 E4	17.95	24.09	2.28	14.17	3/4	186
8	N1B 0350 E3	21.69	37.6	2.95	12.64	3/4	306
10	N1C 0400 E3	25.98	41.73	3.54	14.92	3/4	446
12	N1C 0500 E2	26.57	41.73	3.54	14.92	3/4	585

*Weight of entire assembly

How to order

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
6D	F	06	C	W	B1	G1	J2	AA	M4	AA	R	V1	A	A	-

1.	Valve series description
6D	Full bore, flanged, trunnions, long pattern

2.	Port type
F	Full bore (circular opening)

3.	Valve size
02	NPS 2 or DN 50
03	NPS 3 or DN 80
04	NPS 4 or DN 100
06	NPS 6 or DN 150
08	NPS 8 or DN 200
10	NPS 10 or DN 250
12	NPS 12 or DN 300

4.	Pressure class
C	ASME Class 150
D	ASME Class 300

5.	End connection style
W	Raised face, ASME B16.5 (Ra 3.2~6.3)

6.	Construction and application			
	Seat type	Emergency sealant injection		Cavity drain & vent
Seat		Stem		
B1 ^{a)}	DBB*		Included	Included
B2 ^{b)}	DBB*	Included	Included	Included

*Double block and bleed effect seat configuration

^{a)} For valves sizes NPS 2 to 6 in Class 150 & 300 - Select option B1

^{b)} For valve sizes ≥8" in Class 150 & 300 - Select option B2

7.	Stem seal / Gland packing		
	Stem seal	Temperature range	Gland packing
G1	O-ring	-29°C to +200°C	Graphite

8.	Body material
J2	ASTM A216 Gr. WCB (Carbon steel)
S6	ASTM A351 Gr. CF8M (Stainless steel)

9.	Ball material
AA	^{c)} ASTM A105 + ENP
SP	316 SS

^{c)} Used only in Carbon steel body valves

10.	Stem material
M4	^{c)} 410 SS (13% Cr)
PH	17-4PH SS

^{c)} Used only in Carbon steel body valves

11.	Seat material
AA	^{c)} ASTM A105 + ENP
SP	316 SS

^{c)} Used only in Carbon steel body valves

12.	Seat insert material
R	Reinforced PTFE (RPTFE)

13.	O-ring material
V1	^{d)} FKM (Fluoroelastomer)

^{d)} Selection covers all O-rings used inside the valve

14.	#Bolting material
A	B7/2H
D	^{e)} B8M/8M
F	^{f)} L7M/7M

Body & gland bolting material are same

^{e)} Used on Stainless steel body valves

^{f)} NACE bolting for Carbon steel body valves

15.	Model code
A	For all valves

16.	Option / Modifier code
	Blank, Standard option with Pressure equipment directive 2014/68/EU (PED)
A	Valve with API 6D monogram

Subject to change without prior notice.

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