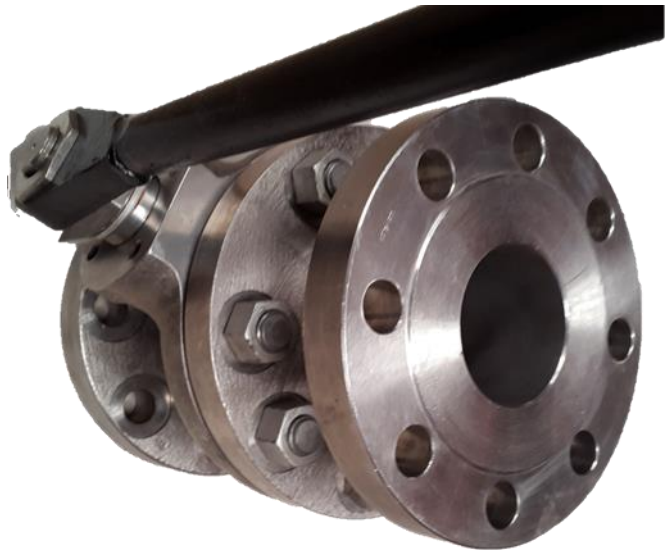
IPV Full Bore Ball Valve
Customer Information Document

SOUTHERN AFRICA



Series 6142

IPV Full Bore Ball Valve

The AVK – IPV brand products were designed for heavy duty, difficult and critical applications in mind for the Chemical, Petro-chemical, Mining and Slurry segments. The first valves were introduced to the South African market more than 50 years ago.

Flanged Ball Valves, **Full bore** is available in sizes DN15 – DN200, and Class #150 & #300

The IPV reduced bore, end entry, floating ball design is manufactured as
One Piece Design – DN25 to DN40
Two Piece Design – DN50 to DN200

Understanding the IPV Factory Figure Number Description –
F523 – Full Bore, Class #150, Body = WCB; Ball & Stem = CF8M; Seats = RTFE
F623 – Full Bore, Class #300, Body = WCB; Ball & Stem = CF8M; Seats = RTFE
F533 – Full Bore, Class #150, Body = CF8M; Ball & Stem = CF8M; Seats = RTFE
F633 – Full Bore, Class #300, Body = CF8M; Ball & Stem = CF8M; Seats = RTFE
F534 – Full Bore, Class #150, Body = CF8M; Ball & Stem = CN7M (Alloy 20); Seats = RTFE
F544 – Full Bore, Class #150, Body = CN7M; Ball & Stem = CN7M (Alloy 20); Seats = PTFE

IPV Full Bore Ball Valve

Features & Benefits

- Available in pressure ratings ASME #150: 1895 kPa @ 38°C and ASME #300: 4965 kPa @38°C
- Each valve is pressure tested and assigned a serial number – No batch testing – assuring quality & traceability
- High precision ball precision finished ball guarantees high- and low-pressure seal, consistent operating torque and longer seat life
- Firesafe design a true secondary metal seat formed to the ball diameter, ensure a tight metal seal under emergency conditions
- Body wall thickness exceed minimum design standards by typically 15%, providing greater wear/corrosion allowance
- Wider Ball slot by 10% and stem significantly larger diameter by 15%, offers advantage in severe local operating conditions
- Blow-out proof stem Pressure safe shoulder design retains stem in body for increased safety
- Integral anti-static device Ensures operational safety by eliminating static build up
- Adjustable gland packing Fully adjustable for vacuum and pressure
- Protected seats are encapsulated and protected from the flow
- All parts and components are locally manufactured

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Materials of Construction

Description	Carbon Steel	Stainless Steel
Body	ASTM A216 Grade WCB	ASTM A351 Grade CF8M
• Ball	ASTM A351 Grade CF8M	ASTM A351 Grade CF8M
Adapter	ASTM A216 Grade WCB	ASTM A351 Grade CF8M
• Seat*	PTFE / RTFE	PTFE / RTFE
• Stem	AISI Grade 316	AISI Grade 316
Gland nut	AISI Grade 316	AISI Grade 316
• Gland bush	AISI Grade 316	AISI Grade 316
• Gland packing	Graphite / PTFE	Graphite / PTFE
• Thrust washer	PTFE	PTFE
• Body gasket	Graphite fiber / PTFE 316SS	Graphite fiber / PTFE 316SS
Anti-static device	AISI Grade 316	AISI Grade 316

- Recommended Spares / * Metal seat available on request
  Note: Other materials available on request for example – CN7M (Alloy 20)

IPV Full Bore Ball Valve

Important Dimensions

		Face to Face		Center to Face		Center to top		Bore through valve		Mass Kg		CV Value	
Class		150	300	150	300	150	300	150	300	150	300	150	300
Valve size (mm)	15**	108	140	54	54	33.5	33.5	12.7	12.7	1.5	1.7	16	16
	20**	117	152	58.5	58.5	41	41	17	17	2.2	3.4	38	38
	25**	127	165	57	57	60.25	60.25	25	25	4	6	91	91
	40**	165	190	76	79	96	96	37	37	7.5	9.5	160	160
	50	203	216	127	133	105.5	146	51	51	11.5	30	328	328
	80	241	283	147	166	163.5	185.5	76	76	38	50	815	815
	100	305	305	201	180	207	230	102	102	52	75	1530	1530
	▲ 150	394	403	214	223	278	285.5	152	152	113	155	3650	3650
	200	457	*	237	*	418	*	203	*	195	*	6550	

* Dimensions available on request
•• Manufactured as a one-piece body
▲ Centre to top 0 dimension for gear operation for 150mm=325

IPV Full Bore Ball Valve

Flow Coefficient and Flow Factor Values

The table below list typical maximum flow coefficient, Cv, and flow factor, Kv, values for IPV full bore ball valves:

Nominal Diameter		Max Cv	Max Kv
Inch	mm	gpm.psi	(m^3/hr).bar
1″	25	90	78
2″	50	470	407
3″	80	1200	1038
4″	100	2500	2163
6″	150	5600	4844
8″	200	10000	8650
10″	250	16000	13840
12″	300	23000	19895

Definitions:

Cv = The quantity of water in U.S. gallons per minute (gal/min) which will pass through a given valve opening with a pressure drop (←p) of 1 lb/in² at 60°F

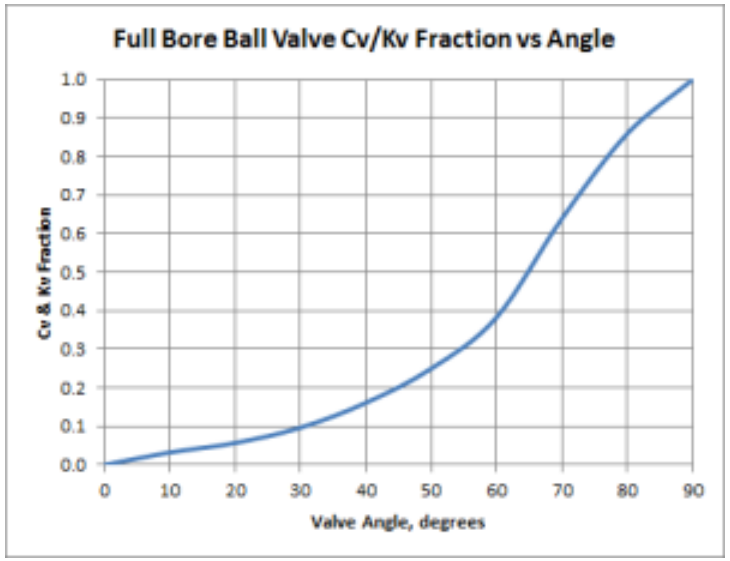
Kv = The quantity of water in m³/hr which will pass through a given valve opening with a pressure drop (←p) of 1 bar at 16°C

Pressure drop = Pressure Differential or “delta P”

IPV Full Bore Ball Valve

Flow Coefficient and Flow Factor Values

This graph shows the Cv or Kv valve fraction vs opening and closing angle of an IPV full bore ball valve:



Note: 1 Litre/second = 15.85 US gal/min

1 US gal/min = 3,785 Litre/minute

Cv – Imperial measurement

Kv – Metric measurement

The full closure curve of a ball valve is then the above graph multiplied by the valve's flow coefficient or factor.

IPV Full Bore Ball Valve

Flow Coefficient and Flow Factor Values

The tables below list the full Cv vs angle closure and opening curves for various IPV valve diameters:

Full Bore Ball Valve Cv vs Angle for Different Diameters

	1"	2"	3"	4"
0°	0	0	0	0
10°	3	15	39	81
20°	5	27	68	142
30°	9	45	116	242
40°	15	76	193	403
50°	23	118	300	625
60°	35	180	460	958
70°	58	301	768	1600
80°	77	404	1032	2150
90°	90	470	1200	2500

	6"	8"	10"	12"
0°	0	0	0	0
10°	180	322	516	741
20°	317	567	907	1303
30°	541	967	1547	2223
40°	902	1611	2578	3706
50°	1400	2500	4000	5750
60°	2147	3833	6133	8817
70°	3584	6400	10240	14720
80°	4816	8600	13760	19780
90°	5600	10000	16000	23000

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Flow Coefficient and Flow Factor Values

Ball Valve Kv vs Angle for Different Diameters

(mm)	25	50	80	100
0°	0	0	0	0
10°	3	13	33	70
20°	4	23	59	123
30°	8	39	100	209
40°	13	65	167	348
50°	19	102	260	541
60°	30	156	398	829
70°	50	260	664	1384
80°	67	350	893	1860
90°	78	407	1038	2163

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Flow Coefficient and Flow Factor Values

(mm)	150	200	250	300
0°	0	0	0	0
10°	156	279	446	641
20°	274	490	784	1127
30°	468	836	1338	1923
40°	780	1394	2230	3205
50°	1211	2163	3460	4974
60°	1857	3316	5305	7626
70°	3100	5536	8858	12733
80°	4166	7439	11902	17110
90°	4844	8650	13840	19895

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	Torque Figures							
	Full Bore Ball Valves							
	Class 150				Class 300			
	5Bar / Nm	10Bar / Nm	15Bar / Nm	20Bar / Nm	25Bar / Nm	30Bar / Nm	40Bar / Nm	50Bar / Nm
15mm	13	14	15	18	20	21	24	27
20mm	15	18	21	23	24	26	29	36
25mm	24	27	30	33	36	38	42	48
40mm	36	39	44	45	48	53	60	72
50mm	75	81	90	98	108	123	150	195
80mm	113	128	140	150	173	180	225	270
100mm	195	225	265	300	360	420	540	720
150mm	420	480	570	630	765	900	1065	1800
200mm	1200	1500	1800	2250	X	X	X	X
250mm	X	X	X	X	X	X	X	X
300mm	X	X	X	X	X	X	X	X

	Torque Figures

**** Torque Figures include a 50% Safety Factor ****

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There are six types of torque exhibited in ball valves:

1. Break to open (BTO)
2. *Running torque (RT):* The torque of the valve when ball opens at approximately 35° to 45° is known as running torque.
3. *End to open (ETO):* The torque of the valve when ball opens at 80° position (i.e. it is about to open) is known as end to open torque.
4. *Break to close (BTC):* When the valve is open, the torque required to break the open position of the ball to close the valve is known as break to close torque.
5. *End to close (ETC):* The torque of the valve when it is about to close, is known as end to close torque.
6. *BTO with double block:* The torque measured when the valve is closed and both the seats are under pressure is known as BTO with double block torque.

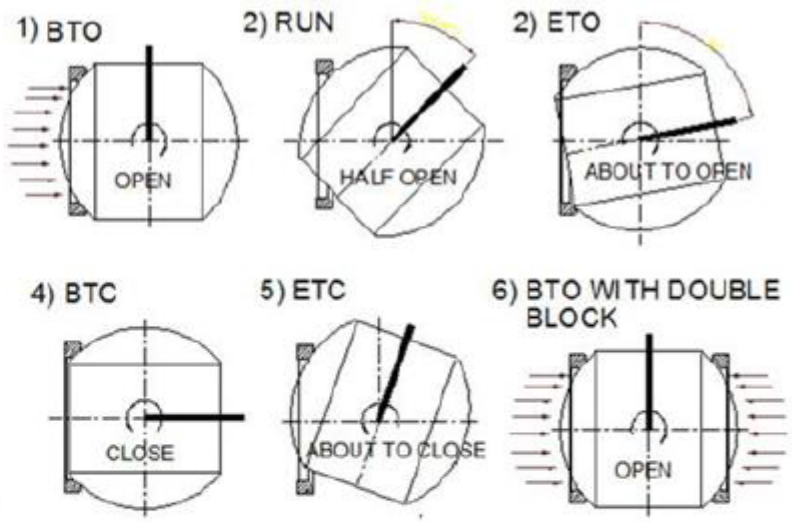

Figure 1:

Position of ball in different torque conditions

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