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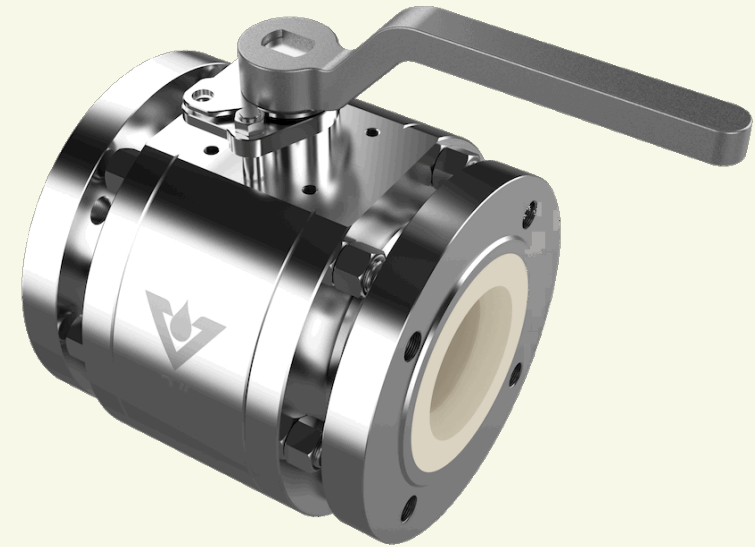
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ANTI-ABRASION CERAMIC BALL VALVE



VerSpec Valve Moyan Co.,Ltd.

<http://www.verspec.com>

Why Choose a VerSpec Ceramic Ball Valve?

Due to the advanced properties of the technical ceramics used, VerSpec Ceramic Ball Valves offer significant advantages over standard material ball valves. VerSpec valves are manufactured using solid 99.5% high-purity alumina ceramic, guaranteeing a valve that is superior in all respects, including resistance to:

- **Corrosion.**

99.5% alumina ceramic is virtually inert to almost all organic and inorganic chemicals. They do not interact with, nor contaminate the process media. They are physically and chemically stable against most acids and alkalis, and offer years of service with little or no corrosive degradation.

- **Abrasion.**

99.5% alumina ceramic is 43% harder than zirconia, 140% harder than porcelain, and 730% harder than stainless steel, an indication of the long-term wear-resistance properties of our valve materials.

- **Cavitation.**

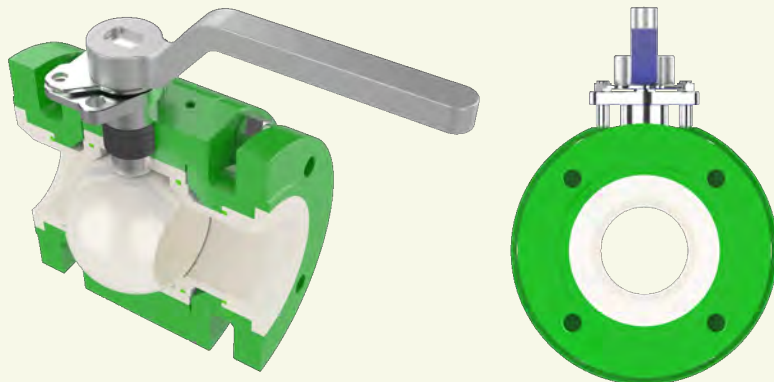
Even severe, continuous cavitation will not degrade or damage our ceramic valve components. Therefore, the VerSpec Ceramic Ball Valve may be used in cavitating or high differential-pressure Applications with little or no harmful effects.

- **Wide Selection of Trims.**

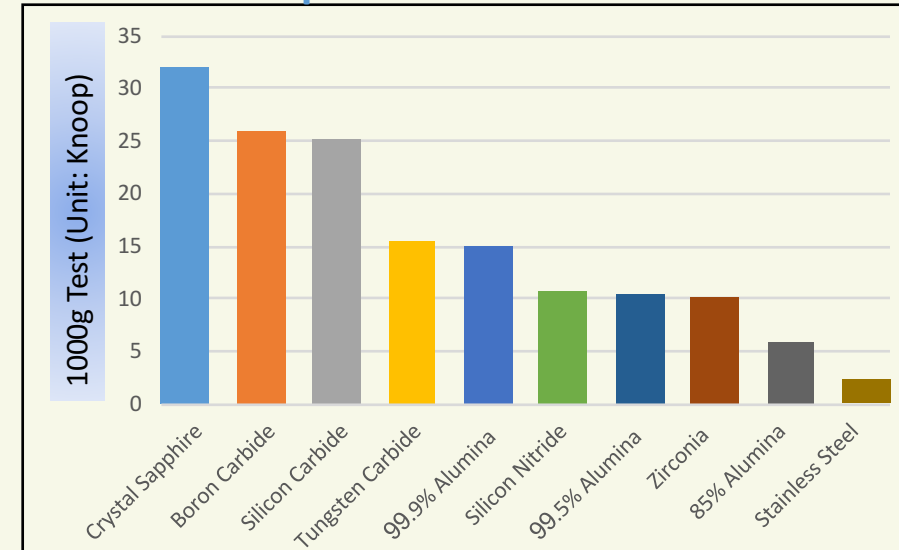
Each valve size offers a variety of four to five different control and round-ported valve trims. This assures highly accurate, tailored flow control as well as minimizing seat and pipe abrasion due to oversized trims.

- **1-Year Warranty**

By utilizing a ceramic material that is both corrosion and abrasion-resistant, we offer an extra level of security to our customers by offering up to a 1-year warranty against corrosion, abrasion, and/or faulty workmanship.



Hardness Comparison



Chemical Durability Comparison Chart

Media	Temp (°C)	99.5% Al ₂ O ₃	99.9% Al ₂ O ₃	ZrO ₂	SiC	Si ₃ N ₄	SS 304	SS 316	HC®	STL #6	STL #12
20% HCL	60	A	A	A	A	B	C	C	B	C	C
20% HCL	95	A	A	A	A	C	-	-	C	C	C
90% H ₂ SO ₄	60	A	A	A	A	A	C	C	B	B	C
90% H ₂ SO ₄	95	A	A	A	A	B	C	C	C	-	-
60% H ₃ PO ₄	60	A	A	A	A	C	C	C	A	B	A
60% H ₃ PO ₄	95	A	A	A	A	C	C	C	A	C	C
10% HF	60	B	B	C	A	A	C	C	B	C	C
46% HF	95	C	C	C	A	C	-	-	C	-	-
60% HNO ₃	95	B	A	A	A	C	B	B	C	B	C
30% NaOH	60	B	A	A	A	B	A	A	A	C	A
30% NaOH	95	B	A	B	A	C	A	B	A	-	B

"A" ≤0.1mmg/cm²/day

Negligible or zero corrosion, recommended for this service

"B" =0.1-0.3mmg/cm²/day

Little or slight corrosion, Use with annual inspection

"C" ≥0.3mmg/cm²/day

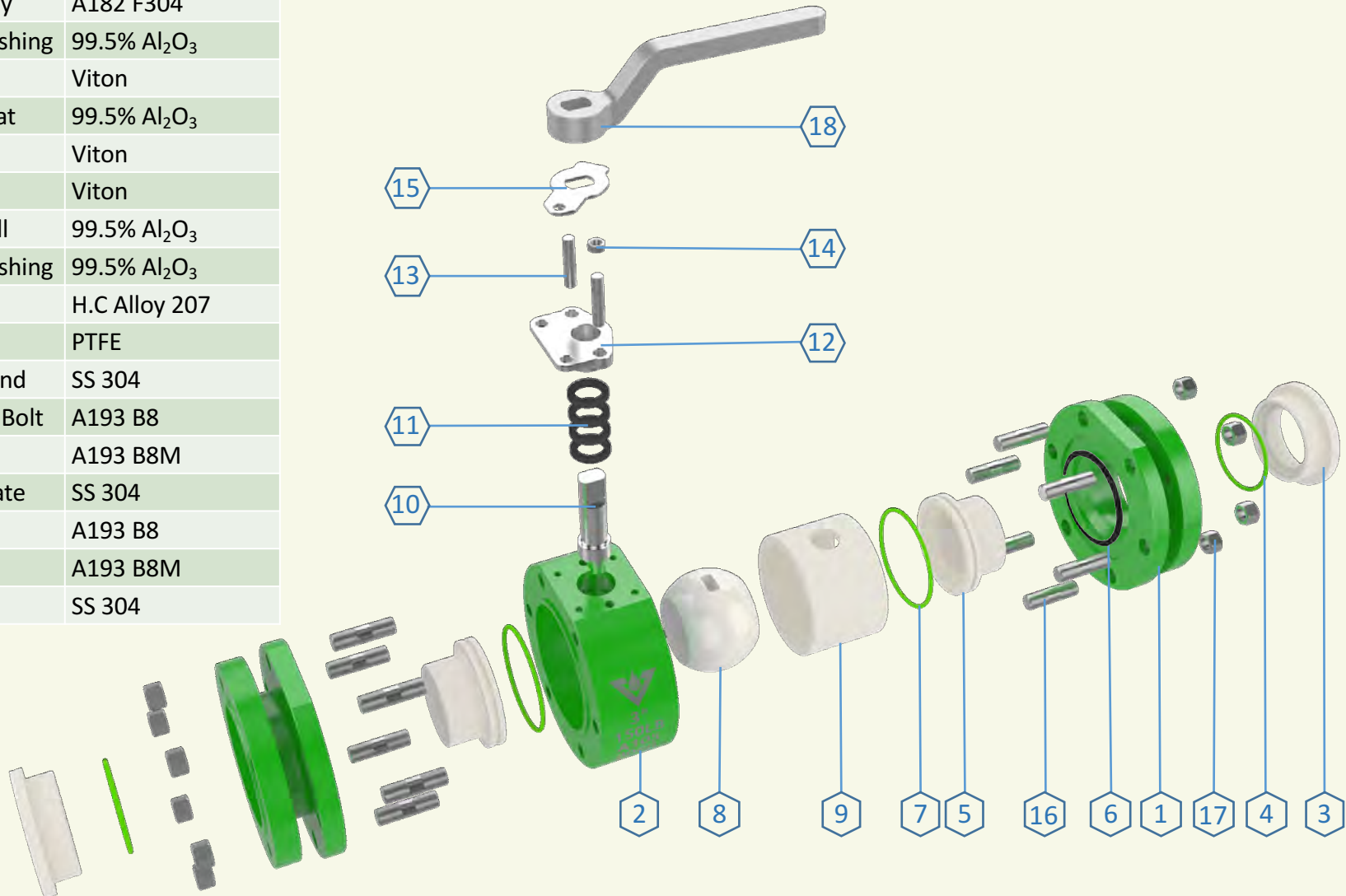
Significant corrosion, and not recommended for valve use

"-" Means test not completed due to violent corrosion

Note: *****Above charts data were obtained under controlled test conditions, and actual valve characteristics and performance may increase or decrease depending upon actual installation conditions.

VCB Series Ceramic Ball Valves

NO.	Part Name	Material Name
1	Side Body	A182 F304
2	Middle Body	A182 F304
3	Ceramic Bushing	99.5% Al ₂ O ₃
4	O Ring	Viton
5	Ceramic Seat	99.5% Al ₂ O ₃
6	O Ring	Viton
7	O Ring	Viton
8	Ceramic Ball	99.5% Al ₂ O ₃
9	Ceramic Bushing	99.5% Al ₂ O ₃
10	Stem	H.C Alloy 207
11	Packing	PTFE
12	Packing Gland	SS 304
13	Positioning Bolt	A193 B8
14	Nut	A193 B8M
15	Locating Plate	SS 304
16	Stud	A193 B8
17	Stud Nuts	A193 B8M
18	Lever	SS 304



Ceramic Material Specification

99.5% Alumina. 99.5% alumina is the standard ceramic material utilized in all VerSpec ceramic valves. In addition to its extreme corrosion resistance and high hardness factor, alumina is also not subject to radioactive degradation, making it an ideal material for a wide variety of aggressive applications. It remains stable at extremely high temperatures, and may even be used for services exceeding 1,000° F.

99.9% Alumina. This high-grade alumina is one of the purest forms of alumina available. It has a finer particle size, is more homogenous, and has less binding material than the 99.5% alumina. As a result, the corrosion and abrasion resistance properties are dramatically increased, making this ceramic an ideal choice for the most severe services, while still maintaining a low purchase cost.

Zirconia. Zirconia has the highest strength and toughness at room temperature of all engineered ceramics. However, zirconia is less corrosion resistant and more susceptible to impingement and rubbing wear, and is therefore used primarily for high torque and/or high pressure applications.

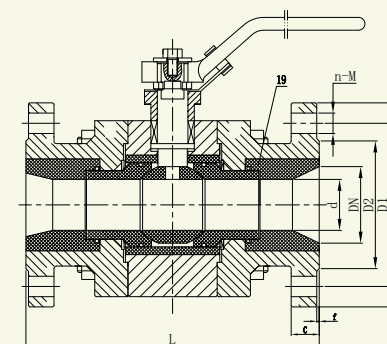
Silicon Carbide. Silicon carbide is only next to diamond and boron carbide in hardness, and 95% harder than our standard alumina. It exhibits high thermal conductivity, high thermal-shock resistance, and strength durability at extreme temperatures. Silicon carbide has the highest corrosion resistance of all fine ceramic materials, and is also one of the few that is resistant to HF, making this material the ceramic of last resort.

Performance Data

Specification	Density	Hardness	Bending Strength	Max Temp	Liner Expansivity	Elastic Modulus	Thermal Conductivity	
Unit	g/cm ³	HRA _≥	Mpa _≥	°C	X10 ⁶ /°C	Gpa	20	
Al ₂ O ₃ Purity	≥95%	3.7	86	300	1500	7.5	300	25
	≥99%	3.8~3.85	88	350	1500	8.2	350	25
	≥99.5%	3.85	88	400	1500	8.2	350	25
	≥99.8%	3.9	88	400	1500	8.2	350	25
ZrO ₂	TZP	5.95	87	1150	500	9.6	210	
	ARZ	5.3	87	800	800	9.6	210	

VCB Series Regular Pattern Ceramic Ball Valves

Technical Specification	
Design & Manufacturing	ASME B 16.34
Face to face	ASME B 16.10
End Flange Drilling	ASME B 16.5
Inspection and Test	API 598

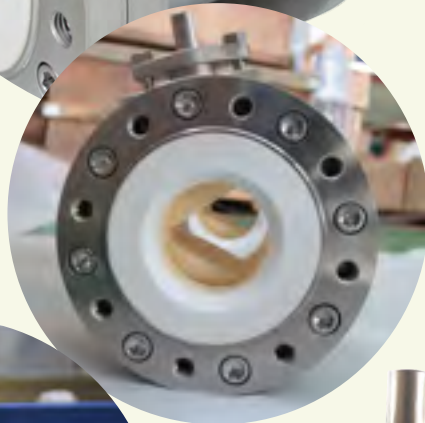


Test Specification			
Pressure Test	Shell Test	1.5	Mpa
	Seal Test	1.1	
	Air Test	0.6	
Applicable Medium		Corrosive medium with solids	

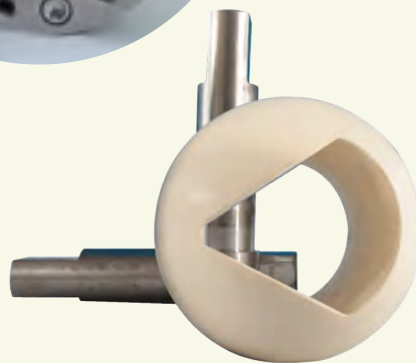
Connection Data of Class 150

Unit: inch

NPS	L	d	D	D1	D2	C	f	n-M
1/2"	4.25	0.4	3.5	2.38	1.38	0.44	0.063	4-M14
3/4"	4.62	0.5	3.88	2.75	1.69	0.5		4-M14
1"	5	0.75	4.25	3.12	2	0.56		4-M14
1-1/2"	6.5	1	5	3.88	2.5	0.69		4-M14
2"	7	1.5	6	4.75	3.62	0.75		4-M16
2-1/2"	7.5	2	7	5.5	4.12	0.88		4-M16
3"	8	2.5	7.5	6	5	0.94		4-M16
4"	9	3	9	7.5	6.19	0.94		8-M16
5"	9.65	4	10	8.5	7.31	0.94		8-M20
6"	10.5	5	11	9.5	8.5	1		8-M20
8"	11.5	6	13.5	11.75	10.62	1.12		8-M20

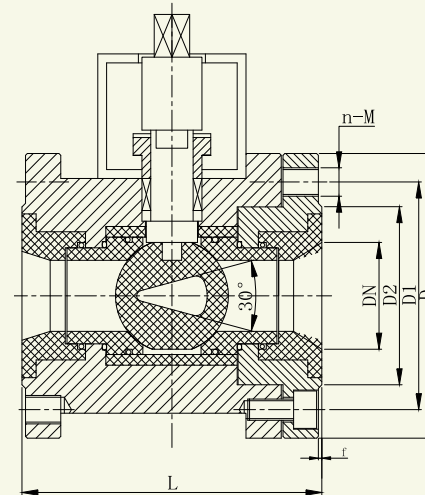


Round Bore



V Bore

VCB Series Short Pattern Ceramic Ball Valves



(Ball's V-port angle: 30° /60° /90° for customers to choose)

Design & Manufacturing		ASME B16.34	
Face to face:		Short Pattern Design	
End Flange Drilling		ASME B16.5	
Inspection & Test		API 598	
Pressure Test	Shell Test	1.5	Mpa
	Seal Test	1.1	
	Air Test	0.6	
Applicable Medium		Corrosive medium with solids	

Connection Data of Class 150

Unit: inch

NPS	L	D	D1	D2	f	n-M
1/2"	2.80	3.74	2.38	1.57	0.04	UNC1/2"-4
3/4"	3.13	3.94	2.75	1.89	0.04	UNC1/2"-4
1"	3.35	4.92	3.12	2.20	0.06	UNC1/2"-4
1-1/2"	4.37	5.51	3.88	2.99	0.06	UNC1/2"-4
2"	4.72	6.10	4.75	3.70	0.06	UNC5/8"-4
2-1/2"	5.51	6.89	5.51	4.09	0.06	UNC5/8"-4
3"	6.48	7.83	6.00	4.88	0.06	UNC5/8"-4
4"	7.62	9.02	7.50	5.83	0.06	UNC5/8"-8
6"	9.84	12.20	9.50	8.35	0.10	UNC3/4"-8
8"	11.22	14.17	11.75	10.24	0.10	UNC3/4"-8

Scope and condition of use

- Medium temperature range: -29-200 °C (-20.2-392 ℉)
- Particle size: smaller than 60 microns
- Working pressure range : 150LB-300LB

Features

- High hardness of ceramics (Rockwell hardness-HRC90)
- Extremely high wear resistance
- Good heat insulation
- Small thermal expansion effect
- Anti erosion

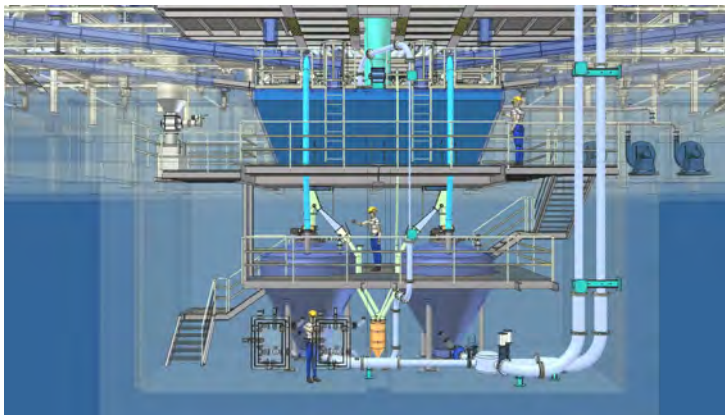
Torque Values

NPS	1/2"	3/4"	1"	1-1/2"	2"	2-1/2"	3"	4"	5"	6"	8"
Opening Torque(N.M)	15	15	22.5	52.5	67.5	112.5	127.5	217.5	450	750	1200

*****Above mentioned torque to be break-away torques without any consideration of safety factors (Min. 1.3 times) for pneumatic actuators.*****

Application Area

It is widely used in power plant fly ash conveying system, desulfurization system, cleaning system, fluid flow control system, chemical plant and other strong corrosion occasions



Flow Coefficient of V-Port Ball Valve from 1/2" - 8" (Cv Chart)

