

## Contact Information

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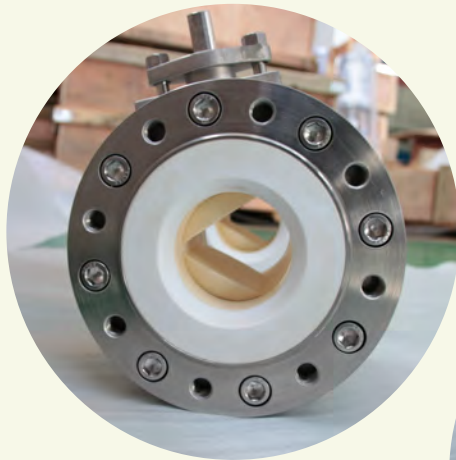
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**Short Pattern Ceramic Ball Valve**

VerSpec Valve Wenzhou 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.**

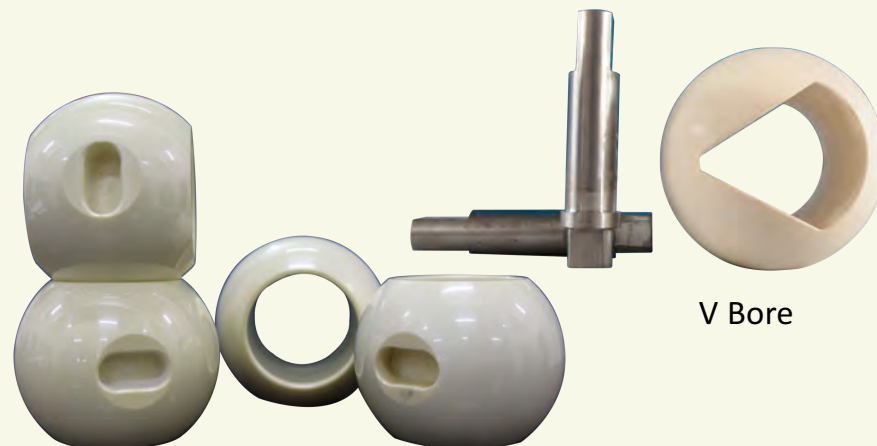
Even severe, continuous cavitation will not degrade or damage our ceramic valve components. Therefore, the VerSpec Ceramic Ball Valve may be used in cavitating or high differential-pressure Applications with little or no harmful effects.

- **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**

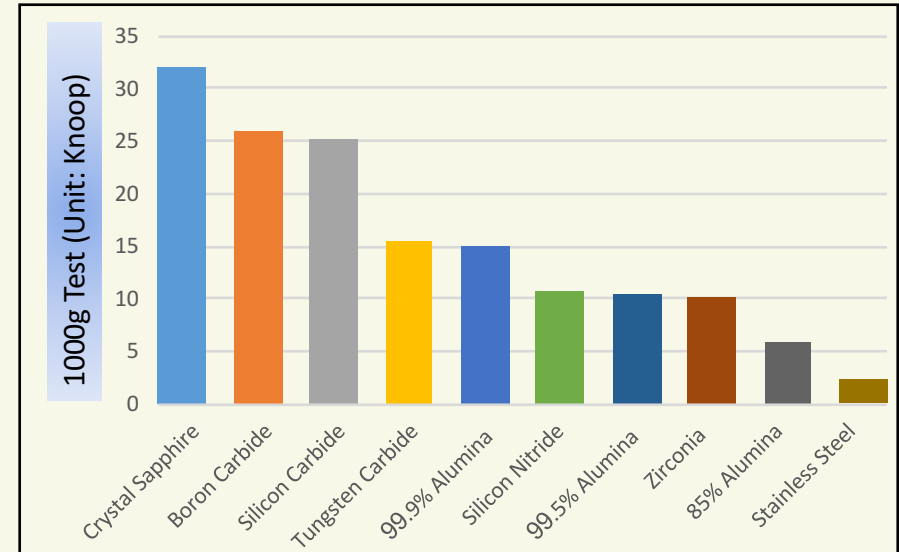
By utilizing a ceramic material that is both corrosion and abrasion-resistant, we offer an extra level of security to our customers by offering up to a 1-year warranty against corrosion, abrasion, and/or faulty workmanship.



Round Bore

V Bore

## Hardness Comparison



## Chemical Durability Comparison Chart

| Media                              | Temp (°C) | 99.5% Al <sub>2</sub> O <sub>3</sub> | 99.9% Al <sub>2</sub> O <sub>3</sub> | ZrO <sub>2</sub> | SiC | Si <sub>3</sub> N <sub>4</sub> | 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 <sub>2</sub> SO <sub>4</sub> | 60        | A                                    | A                                    | A                | A   | A                              | C      | C      | B   | B      | C       |
| 90% H <sub>2</sub> SO <sub>4</sub> | 95        | A                                    | A                                    | A                | A   | B                              | C      | C      | C   | -      | -       |
| 60% H <sub>3</sub> PO <sub>4</sub> | 60        | A                                    | A                                    | A                | A   | C                              | C      | C      | A   | B      | A       |
| 60% H <sub>3</sub> PO <sub>4</sub> | 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 <sub>3</sub>               | 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/cm<sup>2</sup>/day

Negligible or zero corrosion, recommended for this service

"B" =0.1-0.3mmg/cm<sup>2</sup>/day

Little or slight corrosion, Use with annual inspection

"C" ≥0.3mmg/cm<sup>2</sup>/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.

## 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 <sup>3</sup> | HRA <sub>≥</sub> | Mpa <sub>≥</sub> | °C       | X10 <sup>6</sup> /°C | Gpa             | 20                   |    |
| Al <sub>2</sub> O <sub>3</sub> 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 <sub>2</sub>                      | TZP               | 5.95             | 87               | 1150     | 500                  | 9.6             | 210                  |    |
|                                       | ARZ               | 5.3              | 87               | 800      | 800                  | 9.6             | 210                  |    |

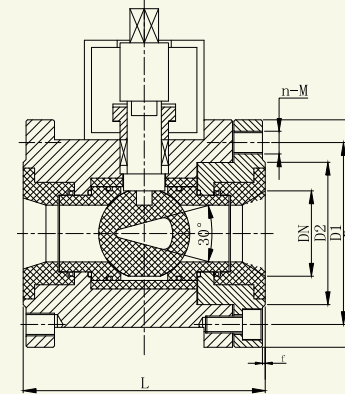
## VCB Series Ceramic Ball Valves

**Design & Manufacturing: ASME B16.34**

**Face to face: ASME B16.10**

**End Flange: ASME B16.5**

**Inspection and 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

| 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 |