



# Superior Can Tooling Components

## The Leading Manufacturer of Ceramic Can Tooling Materials

CoorsTek is internationally recognized as a leader in the development and use of ceramic technology. Manufactured in state-of-the-art facilities, our advanced ceramic can tooling components increase yields, improve quality, and extend machine life in can making plants worldwide.

## Benefits of CoorsTek Ceramics for 2-Piece and 3-Piece Canning Applications

CoorsTek ceramics offer high hardness, corrosion resistance, and thermal management to provide superior performance and life in a variety of tooling applications including:

- Decorator mandrels
- Extractor rings/Domers
- Redraw sleeves
- Spin flangers
- Diablo rolls
- Necking dies and knockouts
- Stripper fingers
- Seaming rolls
- Z-Bars

### Ceramic Necker Tooling



CoorsTek's Hot Isostatically Pressed (HIPped) zirconia materials are the industry standard for ceramic necking dies and knockouts, outperforming tungsten carbide in several ways. The sub-micron grain size enables an excellent polish for low-friction, voiding wrinkling,

puckering, and splitting flanges. HIPped Zirconia has no surface voids to collect buildup, with no binder phase that can be leached out to create voids in service. Residues that appear after long run periods can be easily cleaned with a mild caustic, reducing maintenance costs.

### Ceramic Stripper Tooling

CoorsTek ceramic fingers have exceptional wear resistance, offering superior life as compared to carbides. The ceramic fingers can be reground, further extending the service life. Smoother surfaces and lower friction provide a "velvet touch" that will not mark can bodies. Ceramic fingers are also low maintenance; any aluminum build up can be removed with a mild caustic or light diamond polishing.

### Spin Flangers

CoorsTek ceramic spin flangers provide dramatically reduced "angel hair" production (white lacquer stripped from the inside of the can).

### Z-Bars

Z-Bars generate the correct over-lap of the sheet metal at the weld. As an electrical insulator, CoorsTek engineered ceramics stop any current leakage — enabling the weld control system to be more stable.



### Diablo Rolls

Diablo rolls are used to hold the shape of the can during welding. Zirconia is used for its high electrical resistivity, so the roll is not heated up by eddy currents induced by the large magnetic field generated by the welding process.

### Ceramic Printer Mandrels



Developed and patented by CoorsTek, our ceramic printer mandrels are extremely hard and wear resistant, providing service life in excess of a decade. The highly polished, low-friction surface provides faster loading, and the low thermal expansion coefficient offers dimensional stability over wide range of plant temperatures.

| Property                                     | Units                    | Zirconia Toughened Alumina |                   |                   | MgO Partially Stabilized Zirconia |                   | Sintered Y <sub>2</sub> O <sub>3</sub> Partially Stabilized Zirconia |                   | HIPped Y <sub>2</sub> O <sub>3</sub> Partially Stabilized Zirconia |                   |                   |
|--|--------------------------|----------------------------|-------------------|-------------------|-----------------------------------|-------------------|--|-------------------|--|-------------------|-------------------|
|  |                          | ZTA                        | AZ-67             | AZ-93             | Dura-Z™                           | Technox® 500      | YZTP   | Technox® 2000     | YZTP   | YZ-110 HS         | Technox® 3000     |
| Density                                      | g/cm <sup>3</sup>        | 4.05                       | 4.4               | 4.8               | 5.72                              | 5.6               | 6.02   | 6.02              | 6.07   | 6.07              | 6.07              |
| Color  | -                        | WHITE                      | GRAY              | GRAY              | WHITE                             | YELLOW            | WHITE  | WHITE             | GRAY   | OLIVE-BROWN       | OLIVE             |
| Flexural Strength (MOR), 20° C               | MPa (ksi)                | 450 (65)                   | 1000 (145)        | 1200 (174)        | 758 (110)                         | 545 (79)          | 1240 (180)   | 1000 (145)        | 1720 (250)   | 1500 (218)        | 1400 (203)        |
| Elastic Modulus, 20° C                       | GPa (msi)                | 360 (52)                   | 340 (49)          | 295 (43)          | 200 (29)                          | 200 (29)          | 210 (30)   | 210 (30)          | 210 (30)   | 210 (30)          | 210 (30)          |
| Compressive Strength, 20° C                  | MPa (ksi)                | 2900 (421)                 | -                 | -                 | 1750 (254)                        | 1700 (247)        | 2500 (363)   | 2000 (290)        | 2500 (363)   | 2300 (334)        | 2000 (290)        |
| Hardness – Rockwell (45N)                    |                          | 85                         | 84                | 83                | 77                                | 77                | 81   | 81                | 81   | 81                | 81                |
| Hardness – Vickers (HV 1.0)                  | kg/mm <sup>2</sup>       | 1475                       | 1430              | 1390              | 1200                              | 1200              | 1300   | 1300              | 1300   | 1300              | 1300              |
| Fracture Toughness, K(I c)                   | MPa m <sup>1/2</sup>     | 5.0 - 6.0                  | 7.0               | 7.0               | 11.0                              | 6.0               | 13.0   | 10.0              | 13.0   | 8.5               | 10.0              |
| Thermal Conductivity                         | W/mK                     | 27.0                       | 20.0              | 12.0              | 2.2                               | 2.2               | 2.2  | 2.2               | 2.2  | 2.2               | 2.2               |
| Coefficient of Thermal Expansion, 25-1000° C | 1 X 10 <sup>-6</sup> /°C | 8.3                        | 8.5               | 9.0               | 10.2                              | 10.2              | 10.3   | 10.3              | 10.3   | 10.3              | 10.3              |
| Volume Resistivity, 25° C                    | ohm-cm                   | >10 <sup>14</sup>          | >10 <sup>14</sup> | >10 <sup>14</sup> | >10 <sup>14</sup>                 | >10 <sup>14</sup> | >10 <sup>14</sup>  | >10 <sup>14</sup> | >10 <sup>14</sup>  | >10 <sup>14</sup> | >10 <sup>14</sup> |

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**Americas**  
 +1 303 271 7100 tel  
 +1 855 929 7100 toll free in USA  
 coorstek.com  
 info@coorstek.com

**Europe**  
 +49 160 530 3768  
 infoeurope@coorstek.com

**Japan**  
 +1 81 3 5437 8411  
 japaninfo@coorstek.com

**China**  
 +86 21 6232 1125  
 info\_shanghai@coorstek.com

**Korea**  
 +82 31 613 2946  
 koreainfo@coorstek.com