

Our enterprise specializes in development and manufacturing of triboengineering products and nodes subject to aggressive chemical, temperature and abrasive action with having the full production cycle of products made of powder materials

Virial Ltd. manufactures products out of the following materials



- **SiSiC** - reaction-sintered silicon carbide

- **SSiC** - sintered silicon carbide

- **Al₂O₃** - aluminium oxide

- **WC** - cobalt-bonded tungsten carbide

- **WC-Ni** - nickel-bonded tungsten carbide



Specialists of our enterprise are ready to offer optimal material of friction couples and of the node structure as taking into account design features of the triboengineering products and their operation conditions.

Virial Ltd. turns out any-complexity triboengineering products with standard sizes and according to the Customer's drawings with diametric dimensions up to 150 mm.

Basic physical and mechanical charecteristics of the materials

| Characteristic | SiSiC | SSiC | BK8 | BH8 | Al ₂ O ₃ |
|--|-----------|-----------|-------------|-------------|--------------------------------|
| Density,g/cm ³ , min. | 3,03 | 3,15 | 14,6 | 14,6 | 3,7 |
| Hardness: Vickers HV /Rockwell HRA, GPa | 23 - 33 | 28 - 33 | 87 (HRA) | 85 (HRA) | 17 - 22 |
| Bending strength, MPa | 280 - 450 | 350 - 450 | 1700 - 1800 | 1300 - 1500 | 300 - 350 |
| Young's modulus, GPa | 340 - 400 | 390 - 420 | 540 - 600 | 480 - 550 | 350 - 380 |
| Fracture toughness, MPa*m ^{1/2} | 3,5 - 4,5 | 3 - 4 | 15 - 20 | 13,5 - 18,0 | 3,5 - 4 |
| Compressive strength, MPa, min. | 2500 | 2500 | 3500 | 3400 | 3000 |
| Coefficient of thermal conductivity, W/m*K | 120 - 160 | 80 - 130 | 40 - 50 | 40 - 50 | 25 - 30 |
| Coefficient of thermal expansion, 10 ⁶ K ⁻¹ | 2,4 - 3,6 | 2,8 - 4 | 4,8 - 5,0 | 4,8 - 5,0 | 8 - 9 |

Corrosion resistance in basic liquid media, weight loss, mg/cm² per year

| Liquid media | SSiC No Si | SiSiC (<15% Si) | SiC+C (20% Si, 35% C) | BK8 (92% WC, 8% Co) | BH8 (92% WC, 8% Ni) | Al ₂ O ₃ (99%) |
|---|---------------|--------------------|-----------------------------|---------------------------|---------------------------|---|
| 98% H ₂ SO ₄ , 100 ⁰ C | 1,8 | 55,0 | 106,0 | >1000 | >1000 | 65,0 |
| 50% NaOH, 100 ⁰ C | 2,5 | >1000 | >1000 | 5,0 | 4,1 | 75,0 |
| 53% HF, 25 ⁰ C | <0,2 | 7,9 | 14,3 | 8,0 | 7,5 | 20, |
| 85% H ₃ PO ₄ , 100 ⁰ C | <0,2 | 8,8 | 9,1 | 55,0 | 48 | >1000 |
| 70% HNO ₃ , 100 ⁰ C | <0,2 | 0,5 | 2,5 | >1000 | >1000 | 7,0 |
| 45% KOH, 100 ⁰ C | <0,2 | >1000 | >1000 | 3,0 | 2,8 | 60,0 |
| 25% HCl, 70 ⁰ C | <0,2 | 0,9 | 1,1 | 85,0 | 75 | 72,0 |
| 10% HF + 57% HNO ₃ , 25 ⁰ C | <0,2 | >1000 | >1000 | >1000 | >1000 | 16,0 |

Sintered silicon carbide (SSiC) is more corrosion resistant than reaction bonded silicon carbide (SiSiC) or the other materials. SSiC is recommended as a versatile material for applications in aggressive liquids (pH 0 – 14). Virial Ltd experts are ready to offer their professional advice concerning any your technical problem.

194156, RUSSIA, Saint-Petersburg, Engelsa 27 (Bldg. 143A), P.O. Box 52

Phone: +7 (812) 293-35-00, 294-25-83, Fax: +7 (812) 326-61-97

e-mail: info@virial.ru

www.virial.ru