

## Technical Ceramics – Typical Properties

| Composition                    |                      | Cordierite<br>(C 520)             | Steatite<br>(C221)               | Silicon Nitride<br>(GPSSN)        | Aluminium<br>Nitride | Zirconia Toughened<br>Alumina<br>(ZTA) | Zirconia<br>(Y-TZP)             |
|--------------------------------|----------------------|-----------------------------------|----------------------------------|-----------------------------------|----------------------|--|---------------------------------|
|                                | %                    | 50 SiO <sub>2</sub>               | 60 SiO <sub>2</sub>              | 90 Si <sub>3</sub> N <sub>4</sub> | 95 AlN               | 80 ZrO <sub>2</sub>                    | 95 ZrO <sub>2</sub>             |
|                                | %                    | 35 Al <sub>2</sub> O <sub>3</sub> | 25 MgO                           | -                                 | -                    | 20 Al <sub>2</sub> O <sub>3</sub>      | 5 Y <sub>2</sub> O <sub>3</sub> |
|                                | %                    | 15 MgO                            | 5 Al <sub>2</sub> O <sub>3</sub> | -                                 | -                    | -                                      | -                               |
| Property                       |                      |                                   |                                  |                                   |                      |  |                                 |
| Max Use Temperature (in air)   | °C (°F)              | 1200 (2200)                       | 1200 (2200)                      | 1200 (2200)                       | 1000 (1800)          | 100 (200)                              | 100 (200)                       |
| Bulk Density                   | g/cm <sup>3</sup>    | 2.0                               | 2.7                              | 3.2                               | 3.3                  | 4.2                                    | 6.0                             |
| Open Porosity                  | %                    | <0.5                              | <0.5                             | <0.5                              | <0.5                 | <0.5                                   | <0.5                            |
| Modulus of Rupture (room Temp) | MPa                  | 30                                | 140                              | 700                               | 300                  | 350                                    | 900                             |
| Modulus of Elasticity          | GPa                  | 40                                | 100                              | 300                               | 325                  | 300                                    | 200                             |
| Thermal Conductivity           | W/mK                 | 1.5                               | 2.5                              | 20                                | 170                  | 25                                     | 3                               |
| Thermal Expansion (20-1000°C)  | x10 <sup>-6</sup> /K | 3.0                               | 8.0                              | 3.3                               | 5.5                  | 8.5                                    | 10                              |
| KIC Fracture Toughness         | MPam <sup>1/2</sup>  | -                                 | -                                | 7                                 | -                    | 6                                      | 9                               |
| Volume Resistance              | Ωcm                  | >10 <sup>12</sup>                 | >10 <sup>12</sup>                | >10 <sup>14</sup>                 | >10 <sup>15</sup>    | >10 <sup>14</sup>                      | 5 x 10 <sup>8</sup>             |
| Dielectric Constant            | -                    | -                                 | 6                                | 7                                 | 9                    | 10                                     | 29                              |
| Dielectric Strength            | kV/mm                | -                                 | 20                               | 15                                | -                    | 12                                     | -                               |

This information is given in good faith but does not constitute a specification or guarantee.