

| DATASHEET: RARE EARTH MATERIALS   |                                   |                                       |                          |                                             |                          |
|-----------------------------------|-----------------------------------|---------------------------------------|--------------------------|---------------------------------------------|--------------------------|
| PROPERTIES                        | Units                             | EREY99                                | EREH99                   | EREH97Y                                     | EREC99                   |
|                                   |                                   | Yttrium Oxide                         | Hafnium Oxide            | Hafnium, Stabilised                         | Cerium Oxide             |
| <b>Physical Properties</b>        |                                   |                                       |                          |                                             |                          |
| % Primary Material                | % wt                              | 99.9 (Y <sub>2</sub> O <sub>3</sub> ) | 99.9 (HfO <sub>2</sub> ) | 97.5 (HfO <sub>2</sub> )                    | 99.9 (CeO <sub>2</sub> ) |
| % Secondary Material              | % wt                              | -                                     | -                        | 2.5 (CaO or Y <sub>2</sub> O <sub>3</sub> ) | -                        |
| Density                           | g/cm <sup>3</sup>                 | 4.95                                  | 9                        | 9.5                                         | 7.2                      |
| Open Porosity                     | %                                 | <2                                    | <1                       | <1                                          | <1                       |
| <b>Thermal Properties</b>         |                                   |                                       |                          |                                             |                          |
| Max Operating Temp                | °C                                | 2000                                  | 2812                     | 1700                                        | 1900                     |
| Max Operating Temp                | °F                                | 3632                                  | 5093                     | 3092                                        | 3452                     |
| Thermal Conductivity (20 - 100oC) | W/m <sup>o</sup> K                | 0.3                                   | -                        | -                                           | -                        |
| Coefficient Thermal Expansion     | x10 <sup>-6</sup> K <sup>-1</sup> | 8.5-13.7                              | -                        | -                                           | -                        |
| <b>Mechanical Properties</b>      |                                   |                                       |                          |                                             |                          |
| Flexural Strength                 | psi                               | -                                     | -                        | -                                           | -                        |
| Hardness- Mohs                    | Mohs                              | -                                     | -                        | -                                           | -                        |
| Tensile Strength                  | psi                               | -                                     | -                        | -                                           | -                        |
| <b>Electrical Properties</b>      |                                   |                                       |                          |                                             |                          |
| Volume Resistivity at 20°C        | ohm - cm                          | -                                     | -                        | -                                           | -                        |
| Volume Resistivity at 600°C       | ohm - cm                          | -                                     | -                        | -                                           | -                        |
| Dielectric Constant               | 25°C & 1 mhz                      | -                                     | -                        | -                                           | -                        |

\*\* - Full Chemical Analysis Available On Request

Additional material properties are available - please ask at [enquiries@earthwaterfire.com](mailto:enquiries@earthwaterfire.com)

The values given on this data sheet were established on test pieces and identify the characteristic data of our products. These values should be used for guidance only as actual values will depend on individual geometry and application of each part.

**For Further Information contact us at: [enquiries@earthwaterfire.com](mailto:enquiries@earthwaterfire.com)**