

## Thermal Shock Resistance and Other Properties of 60 to 80% Alumina Brick

| <b>60% Alumina Compositions</b>                       |          |          |          |          |
|---|----------|----------|----------|----------|
| <b>Composition</b>                                    | <b>A</b> | <b>B</b> | <b>C</b> | <b>D</b> |
| Alumina content                                       | 58       | 63       | 62       | 59       |
| Bulk density, gm/cc                                   | 2.52     | 2.60     | 2.55     | 2.58     |
| % Apparent porosity                                   | 14.8     | 13.4     | 14.0     | 12.2     |
| Modulus of rupture, MPa                               | 21.8     | 20.5     | 12.7     | 16.0     |
| Modulus of elasticity, GPa                            | 66.9     | 57.7     | 33.4     | 44.1     |
| Work of fracture, J/m <sup>2</sup>                    | 66.4     | 88.5     | 96.3     | 104      |
| Thermal expansion, x10 <sup>-6</sup> °C <sup>-1</sup> | 5.08     | 5.04     | 4.61     | 5.38     |
| R <sub>st</sub> , m <sup>1/2</sup> °C                 | 6.20     | 7.77     | 11.6     | 9.03     |
| R <sup>'''</sup> , x10 <sup>-2</sup> m                | 1.18     | 1.54     | 2.53     | 2.22     |
| <b>70-80% Alumina Compositions</b>                    |          |          |          |          |
| <b>Composition</b>                                    | <b>E</b> | <b>F</b> | <b>G</b> | <b>H</b> |
| Alumina content                                       | 58       | 63       | 62       | 59       |
| Bulk density, gm/cc                                   | 2.66     | 2.69     | 2.76     | 2.92     |
| % Apparent porosity                                   | 16.8     | 15.3     | 18.8     | 15.3     |
| Modulus of rupture, MPa                               | 11.7     | 12.8     | 12.0     | 23.0     |
| Modulus of elasticity, GPa                            | 28.6     | 32.3     | 30.3     | 71.7     |
| Work of fracture, J/m <sup>2</sup>                    | 111      | 102      | 107      | 113      |
| Thermal expansion, x10 <sup>-6</sup> °C <sup>-1</sup> | 6.08     | 6.05     | 6.44     | 7.15     |
| R <sub>st</sub> , m <sup>1/2</sup> °C                 | 10.2     | 9.27     | 9.20     | 5.55     |
| R <sup>'''</sup> , x10 <sup>-2</sup> m                | 2.92     | 2.52     | 2.84     | 1.94     |

Source: UNITECR '97 Proceedings.