



INSTITUTE OF REFRACTORIES ENGINEERS

Founded 1961

www.ireng.org



Exercise 1 – Thermal Shock Parameters

Answers

Property and symbol	Silicon Carbide Brick	Mullite Brick	Magnesia Carbon Brick	Magnesia Chrome Brick	Fireclay Brick
Density, ρ (g/cm ³)	2.7	2.55	2.95	3.3	2.2
Thermal Conductivity, λ (W/mK)	14	2.5	11	4.6	1.8
Thermal Expansion, α ($\times 10^{-5} \text{ }^\circ\text{C}^{-1}$)	4	4.5	13	10	6.5
MoR, σ_f (MPa)	45	14	15	12	6
Elastic Modulus, E (GPa)	50	40	0.95	15	15
Poisson's Ratio, ν	0.2	0.2	0.2	0.2	0.2
Specific Heat Capacity, c (J/kg. $^\circ\text{C}$)	750	1100	750	850	1050
Work of Fracture, W_f (N/m)	50	48	130	150	36
R	0.27	0.09	1.46	0.10	0.07
R'	3.78	0.23	16.03	0.44	0.13
R''	1.87E-03	8.32E-05	7.25E-03	1.57E-04	5.75E-05
R'''	1.54	12.24	0.69	19.53	18.75
Rst	0.25	0.24	0.90	0.32	0.24