



Thermal Ceramics was first to introduce insulating firebrick (IFB) to the industry in the 1930's. The IFB are manufactured with a unique slurry casting process which creates a network of microporosity which produces low thermal conductivity and good thermal shock characteristics. This process produces brick that are some of the most efficient insulators available in the market. The anorthite mineralogy ( $\text{CaO} \cdot \text{Al}_2\text{O}_3 \cdot 2 \text{SiO}_2$ ) of these low temperature IFB gives them excellent strength at operating temperatures and resistance to corrosive alkali environments.

### Features

- Extremely low "K" factors
- Low densities
- Low heat storage
- Excellent strength at room and high temperatures
- Excellent resistance to alkali attack
- Excellent service in applications involving special atmospheres

### Applications

- Backup insulation for carbon baking furnaces
- Backup insulation in aluminum electrolytic cells
- Electrical kilns for industrial and hobby use
- Backup insulation for blast furnace stove linings
- Linings for carbonizing furnaces
- Forge furnace linings
- Heat transfer linings

### Physical Characteristics

Standard sizes*	9" x 4½" x 2½" and 9" x 4½" x 3" (22.5 cm x 11.25 cm x 6.25 cm and 22.5 cm x 11.25 cm x 7.5 cm)
IFB 23 Tile	9" x 9" x 3" to 24½" x 9" X 3" (22.5 cm x 22.5 cm x 7.5 cm to 61.25 cm x 22.5 cm x 7.5 cm)

\* Special sizes available upon request.

### Manufacturing Process

K-20, TC-23, TC-23 HS, K-23, K-25 IFB	casting
IFB 23 Tile	slinger

# Low Temperature Insulating Firebrick

## Product Information

<b>Physical Properties</b>	<b>K-20</b>	<b>TC-23</b>	<b>TC-23 HS</b>	<b>K-23</b>	<b>IFB 23 Tile</b>	<b>K-25</b>
Recommended Hot Face temperature, °F (°C)	2000 (1093)	2300 (1260)	2300 (1260)	2300 (1260)	2300 (1260)	2500 (1371)
Melting temperature, °F (°C)	2750 (1510)	2750 (1510)	2750 (1510)	2750 (1510)	2750 (1510)	2800 (1538)
Density, avg (ASTM C 134)						
lb/9" straight, (kg) (kg)	1.86 (0.84)	2.17-2.52 (0.99-1.15)	2.3 (1.1)	1.86 (0.84)	2.2 (1)	2.3 (1.05)
pcf (kg/m <sup>3</sup> )	31 (497)	38-44 (609-705)	40 (641)	31 (497)	37 (593)	40 (641)
Modulus of rupture, (ASTM C 133)						
psi (Mpa)	110 (0.76)	110-160 (0.75-1.03)	140 (1.0)	120 (0.83)	105 (0.72)	140 (0.96)
Cold crushing strength, (ASTM C 133)						
psi (Mpa)	125 (0.86)	140-220 (0.97-1.52)	200 (1.4)	135 (0.93)	125 (0.86)	220 (1.52)
Permanent linear change, % (per ASTM C 120)						
@ 1950°F (1066°C)	0	-	-	-	-	-
@ 2250°F (1232°C)	0	-0.1 to -0.4	0.0	0	0	-
@ 2450°F (1343°C)	-	-	-	-	-	-0.1
Deformation under hot load, % @ 10 psi (ASTM C 16)						
1½ hr @ 2000°F (1093°C)	0	-0.1 to -0.3	0	0	0	-
1½ hr @ 2200°F (1204°C)	-	-	-	-	-	-0.1
<b>Chemical Analysis, nominal, %</b>						
Alumina, Al <sub>2</sub> O <sub>3</sub>	38	39-43	38.8	38	38.8	45
Silica, SiO <sub>2</sub>	43.6	43-45	47.8	43.6	47.8	38
Ferric oxide, Fe <sub>2</sub> O <sub>3</sub>	0.4	0.4-0.6	0.4	0.4	0.4	0.2
Titanium oxide, TiO <sub>2</sub>	1.5	1.5-1.9	1.6	1.5	1.6	1.6
Calcium oxide, CaO	16	10-12	10.9	16	10.9	14.5
Magnesium oxide, MgO	0.1	0.1-0.2	0.2	0.1	0.2	0.2
Alkalies, as, Na <sub>2</sub> O and K <sub>2</sub> O	0.4	0.4-0.7	0.3	0.4	0.3	0.5
<b>Thermal Conductivity, BTU•in./hr•ft<sup>2</sup>•°F (w/m•k), ASTM C 201</b>						
Mean temperature						
@ 500°F (260°C)	0.95 (0.13)	1.1-1.2 (0.16-0.17)	1.2 (0.17)	0.95 (0.13)	1.0 (0.14)	1.12 (0.16)
@ 1000°F (538°C)	1.18 (0.17)	1.3-1.4 (0.19-0.20)	1.5 (0.22)	1.18 (0.17)	1.3 (0.18)	1.28 (0.18)
@ 1500°F (815°C)	1.45 (0.21)	1.6-1.7 (0.23-0.25)	1.7 (0.25)	1.45 (0.21)	1.6 (0.23)	1.46 (0.21)
@ 2000°F (1093°C)	1.74 (0.25)	1.75-1.9 (0.25-0.27)	2.0 (0.29)	1.74 (0.25)	1.8 (0.25)	1.65 (0.24)

The values given herein are typical average values obtained in accordance with accepted test methods and are subject to normal manufacturing variations. They are supplied as a technical service and are subject to change without notice. Therefore, the data contained herein should not be used for specification purposes. Check with your Thermal Ceramics office to obtain current information.

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