

**K<sup>®</sup>-23, TC<sup>™</sup>-23, IFB 23 Tile, K-25**

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**Description**

Thermal Ceramics was first to introduce insulating firebrick (IFB) to the industry in the 1930's. The K-IFB are manufactured with a unique slurry casting process which creates a network of microporosity that 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 high temperature firing and resultant anorthite mineralogy ( $\text{CaO} \cdot \text{Al}_2\text{O}_3 \cdot 2 \text{SiO}_2$ ) of these low temperature K-IFB gives them excellent strength at operating temperatures and resistance to corrosive alkali environments.

K-23 is a 2300°F (1260°C) rated "flagship" IFB

- Low density
- High hot strengths
- Good thermal stability
- Ultra low thermal conductivity

TC-23 is a 2300°F (1260°C) rated economical IFB

- Properties close to K-23
- Slightly lower appearance standard

IFB 23 Tile is 2300°F (1260°C) rated tile brick

- Large shape format

K-25 is a 2500°F (1371°C) rated IFB

- Low shrinkage at use limit
- Excellent insulation stability

**Features**

- Extremely low thermal conductivity
- Low densities
- Low heat storage
- Good strength at room and high temperatures
- Excellent resistance to alkali attack

**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

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<b>Physical Properties</b>	<b>K-23</b>	<b>TC-23</b>	<b>IFB 23 Tile</b>	<b>K-25</b>
Recommended Hot Face use limit, °F (°C)	2300 (1260)	2300 (1260)	2300 (1260)	2500 (1371)
Density, ASTM C 134				
lb/9" straight (kg)	1.93 (0.87)	1.9 (0.85)	2.2 (1.0)	2.3 (1.05)
pcf (kg/m <sup>3</sup> )	31 - 35 (497-560)	30 - 36 (480 - 576)	37 (593)	38 - 41 (593-641)
Melting temperature, °F	2750 (1510)	2750 (1510)	2750 (1510)	2800 (1538)
Modulus of rupture, ASTM C 133				
psi (MPa)	115 (0.79)	105 (0.72)	105 (0.72)	135 (0.93)
Cold crushing strength, ASTM C 133				
psi (MPa)	145 (1.0)	125 (0.86)	125 (0.86)	200 (1.38)
Permanent linear change, %, per ASTM C 210				
@ 2250°F (1232°C)	0 to -0.1	-0.2	0 to -0.1	-
@ 2450°F (1343°C)	-	-	-	-0.3
Deformation under hot load, % @ 10 psi, ASTM C 16				
1½ hr @ 2000°F (1093°C)	0	0.1	0	0
1½ hr @ 2200°F (1204°C)	0.3	-	-	0.1
Coefficient of thermal expansion				
in/in°Fx10 <sup>-6</sup>	3	3	-	3.1
<b>Chemical Analysis, %</b>				
Alumina, Al <sub>2</sub> O <sub>3</sub>	38	38	38.5	46
Silica, SiO <sub>2</sub>	45	45	47.5	37.5
Ferric oxide, Fe <sub>2</sub> O <sub>3</sub>	0.3	0.3	0.4	0.3
Titanium oxide, TiO <sub>2</sub>	1.6	1.6	1.6	1.4
Calcium oxide, CaO	15	15	11	14
Magnesium oxide, MgO	0.1	0.1	0.2	0.1
Alkalies, as, Na <sub>2</sub> O and K <sub>2</sub> O	0.5	0.5	0.3	0.4
<b>Thermal Conductivity, BTU•in./hr•ft<sup>2</sup>•°F (W/m•K), ASTM C 201</b>				
Mean temperature				
@ 500°F (260°C)	0.92 (0.13)	0.95 (0.13)	1.0 (0.14)	1.06 (0.15)
@ 1000°F (538°C)	1.14 (0.16)	1.2 (0.17)	1.3 (0.18)	1.22 (0.18)
@ 1500°F (815°C)	1.39 (0.20)	1.5 (0.22)	1.6 (0.23)	1.38 (0.20)
@ 2000°F (1093°C)	1.64 (0.24)	1.7 (0.24)	1.8 (0.25)	1.54 (0.22)

**Standard Sizes\***
**K-23, TC-23, K-25**

9" x 4½" x 2½" (229mm x 114mm x 63mm)

9" x 4½" x 3" (229mm x 114mm x 76mm)

9" x 6" x 3" (229mm x 152mm x 76mm)

9" x 6¾" x 3" (229mm x 171mm x 76mm)

13½" x 4½" x 3" (343mm x 114mm x 76mm)

**IFB 23 Tile**

9" x 9" x 3" to 24½" x 9" x 3" (229mm x 229mm x 76mm to 622mm x 229mm x 76mm)

\* Special sizes available upon request, including arch, wedge and key shapes.

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.