

# RATHLOC®

## Mortar Free Kiln Car Refractory System

### RATHLOC® Interlocking Brick System:

- ▲ Button and dimple system interlock layers
- ▲ Mortar free
- ▲ Hydraulically pressed, high fired brick
- ▲ Grades available for load bearing or insulating layers
- ▲ Designs for applications up to 1800°C
- ▲ One set of molds in USA and identical set in Austria

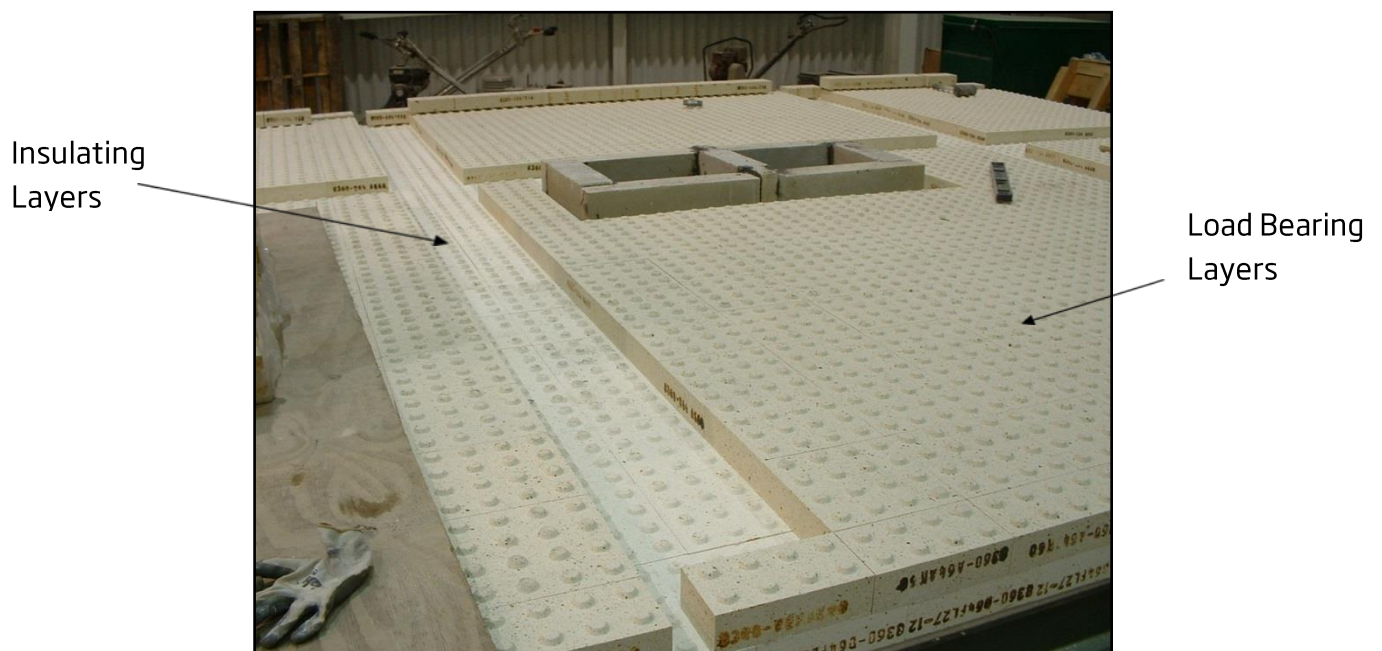
### RATHLOC® Interlocking Brick System - Insulating Brick

Properties	Units	FL 27-12	FL 32-12	FL 33-13/2	FL 33-16/2
<b>Classification Temp</b>	°F °C	2732 1500	3200 1760	3270 1800	3270 1800
<b>Density</b>	lbs/ft <sup>3</sup> (kg/m <sup>3</sup> )	75 (1200)	75 (1200)	81 (1300)	100 (1600)
<b>Cold Crush Strength</b>	Psi MPa	725 5	870 6	1740 12	2175 15
<b>Permanent Linear Change - 24 hrs</b>	%	-1.4 @ 2750°F	+0.7 @ 3150°F	+0.4 @ 3272°F	+0.4 @ 3272°F
<b>Thermal Conductivity</b> 1112°F(600°C) 1472°F(800°C) 1832°F(1000°C) 2192°F(1200°C) 2552°F(1400°C)	BTUin/hrft <sup>2</sup> °F (W/mK)	3.6 (0.52) 4.0 (0.57) 4.4 (0.63) 4.8 (0.69)	4.6 (0.66) 4.7 (0.67) 4.9 (0.71) 5.3 (0.77) 6.0 (0.86)	7.9 (1.13) 8.1 (1.16) 8.3 (1.19) 8.6 (1.22)	8.1 (1.16) 8.2 (1.17) 8.3 (1.19) 8.6 (1.22)
<b>Chemical Analysis</b> Al <sub>2</sub> O <sub>3</sub> SiO <sub>2</sub> Fe <sub>2</sub> O <sub>3</sub> MgO + CaO Alk. Oxides (Na, K)	%	66 31 1.2	78 21 0.2 0.1	91 8.1 0.2 -	91 8.1 0.2 -

### RATHLOC® Interlocking Brick System - Dense Brick

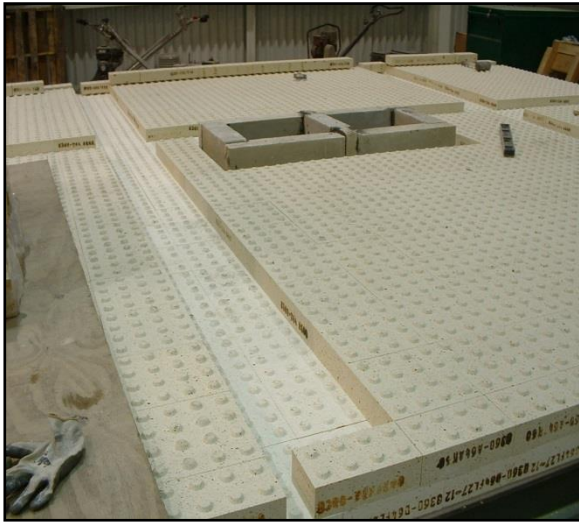
Properties	Units	AK70	K901	K901 HT
Density	lbs/ft <sup>3</sup> (g/cm <sup>3</sup> )	168 2.7	187 3.0	196 3.15
Chemical Analysis	Al <sub>2</sub> O <sub>3</sub> SiO <sub>2</sub> Fe <sub>2</sub> O <sub>3</sub>	70 28 1	90 9 0.15	90 9 0.15
Apparent Porosity	%	< 15	16	12
Refractoriness under load, DIN 51053 to °F	°F °C	> 3000 > 1650	> 3000 > 1650	> 3000 > 1650
Creep in Compression Load 0.2Mpa (28.4Psi) Temp. 1500°C (2732°F)	e25[%] s25-15[%]	2.79 0.052	0.25 NA	0.01 0.001
Thermal Shock Resistance DIN51068-1, water quench	Cycles	> 100	110	90
Hot Flexural Strength @ 1500°C (2732°F)	Psi (MPa)	407 (2.8)	575(4.0)	1585(11.0)

Layering design determined by load, cycle, etc

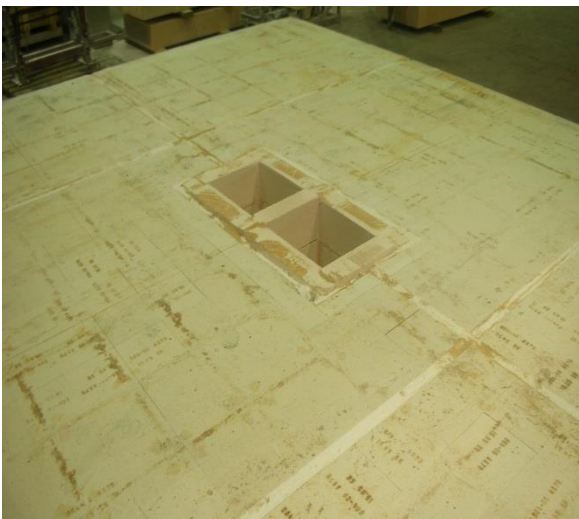


## RATHLOC® Large Bell Kiln Car

16' x 18' kiln car for 1610°C - as assembled



16' x 18' kiln car for 1610°C - after 1 year service





## RATHLOC® Elevator Kiln - 1620°C



Assembly, July 2003



Recent Photo, No Maintenance

### RATHLOC® Interlocking Brick System - Tunnel Kiln Cars

- ▲ After 8 months service
- ▲ Harrop Tunnel Kiln
- ▲ 1620°C firing temp
- ▲ 20 hr cycle cold to cold

