Kao-Tuff™ 110FF Monolithic

Product Data Sheet

Product Description

Kao-Tuff 110FF is a medium-weight erosion-resistant monolithics with excellent insulating properties installed by standard vibratory casting techniques. Abrasion losses 7 -15cc's and a thermal conductivity of 5.3 at 816°C (1500°F) make it effective for numerous applications in FCCU and other industrial uses.

Kao-Tuff 110 FF is the free flow version where extra flow capability is needed.

Instructions for Using

Casting: Highest strength is obtained with a monolithic refractory by using the least amount of clean mixing water which will allow thorough working of material into place by vibrating or rodding. A mechanical mixer is required for proper placement (paddle-type mortar mixer best suited). After adding the recommended amount of water to achieve a ball-in-hand consistency, wet mix for 4-6 minutes. Place material within 20 minutes after mixing.

Precautions: Use watertight forms; when placing against porous surfaces, waterproof the surface. For maximum strength, cure 24 hours under damp conditions before initial heat-up. Keep freshly placed monolithic warm during cold weather, ideally between 16°C and 27°C (60°F and 80°F). In hot conditions, keep mix temperatures below 80°F or working time will be greatly reduced. New monolithic installations must be heated slowly the first time.

For detailed installation instructions and commissioning schedules, please contact your Morgan Advanced Materials-Thermal Ceramics representative.

Properties	Kao-Tuff 110FF
Region of Manufacture	Americas
Bond type	Hydraulic
Raw material base	Fireclay
Method of installation	Free Flow/Vibratory Cast
Maximum grain size, mm	4
Maximum service temperature, °C (°F)	1316 (2400)
Net material requirement, kg/m^3 (pcf)	1794 (112)
Water addition, % by weight	
casting by vibrating	14-15.5/13-15
Packaging in bags, kg (lbs)	25 (55)

www.morganthermalceramics.com
Email: marketing.tc@morganplc.com
Thermal Ceramics is a business of Morgan Advanced Materials

Kao-Tuff™ 110FF Monolithic

Product Data Sheet

Properties	Kao-Tuff 110FF
Bulk Density, kg/m^3 (pcf), ASTM C134	
dried 24 hours @ 105°C (220°F)	1810-1986 (113-124)
fired 5 hours @ 816°C (1500°F)	1714-1874 (107-117)
Modulus of Rupture, MPa (psi), ASTM C133	
dried 24 hours @ 105°C (220°F)	5.2-8.3 (750-1200)
fired 5 hours @ 816°C (1500°F)	4.5-6.9 (650-1000)
fired 5 hours @ maximum service temperature °C (°F)	4.5-6.9 (650-1000)
Cold Crushing Strength, MPa (psi), ASTM C133	
dried 24 hours @ 105°C (220°F)	41.4-69.0 (6000-10000)
fired 5 hours @ 816°C (1500°F)	41.4-75.9 (6000-11000)
fired 5 hours @ maximum service temperature °C (°F)	41.4-69.0 (6000-10000)
Permanent Linear Change, %, ASTM C113	
dried 24 hours @ 105°C (220°F)	0 to -0.2
fired 5 hours @ 816°C (1500°F)	-0.1 to -0.3
fired 5 hours @ maximum service temperature °C (°F)	-0.6 to +0.4
Abrasion loss, cm^3, ASTM C704	
fired 5 hours @ 816°C (1500°F)	9-15
Chemical Analysis, %, Calcined Basis	
Alumina, Al_2O_3	49
Silica, SiO_2	33
Iron Oxide, Fe_2O_3	1.7
Titania, TiO_2	0.7
Lime, CaO	14
Magnesia, MgO	0.4
Alkali as, $Na_2O + K_2O$	1.2
Thermal Conductivity, W.m•K (BTU•in/hr•ft^2•°F) , ASTM C417	
260°C (500°F)	0.74 (5.1)
538°C (1000°F)	0.75 (5.2)
816°C (1500°F)	0.76 (5.3)
1093°C (2000°F)	0.78 (5.4)

Storage and Shelf Life

- Monolithics should be stored in a dry, well-ventilated area and held off the ground on pallets ideally with the original packaging intact. Keep out of rain and damp conditions.
- Normal shelf life is 12 months from date of manufacture when properly stored.

www.morganthermalceramics.com
Email: marketing.tc@morganplc.com
Thermal Ceramics is a business of Morgan Advanced Materials