

### Product Description

Kao-Tuff FS Gun is a medium-weight, fused silica based monolithic with excellent thermal shock resistance. It is installed by dry gunite methods.

### Instructions for using

**Gunning:** Use suitable gunite equipment. Material should be pre-dampened uniformly with approximately 2-4% of clean water. This should be mixed in a mechanical mixer and allowed to slake if necessary for up to 20 minutes (the cooler the mix temperature, longer the slaking time) before placing into gun. At 50° F a slaking time of 10-15 minutes is normal. This will greatly reduce rebound and dusting.

Add the required amount of water at nozzle using a recommended minimum 18" nozzle extension past the water ring for better intermixing. A water needle valve is also needed to control flow of the water more precisely. Suggested air pressure at the nozzle is 2.5 to 3.5 bar (35 to 50 psi).

For improved properties and lower rebound it is recommended that a water booster pump be used to increase the plant water pressure. For best results a 16 hole water ring along with water pressure at the nozzle of 125 to 200 psi will help drive the water into the material at the water ring for the best mixing of the water and monolithic.

**Other:** Kao-Tuff FS Gun can be hand rammed by adding a sufficient amount of water for proper consistency. Follow recommended mixing instructions described above.

**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). 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 FS Gun
Region of Manufacture	Americas
Bond type	Hydraulic
Raw material base	Fused Silica
Method of installation	Gun/Ram
Maximum grain size, mm	6
Maximum service temperature, °C (°F)	1316 (2400)
Net material requirement, kg/m <sup>3</sup> (pcf)	1987 (124)
Packaging in bags, kg (lbs)	25 (55)

Whilst the values and application information in this datasheet are typical, they are given for guidance only. The values and the information given are subject to normal manufacturing variation and may be subject to change without notice. Morgan Advanced Materials – Thermal Ceramics makes no guarantees and gives no warranties about the suitability of a product and you should seek advice to confirm the product's suitability for use with Morgan Advanced Materials - Thermal Ceramics.

# Kao-Tuff™ FS Gun Monolithic

## Product Data Sheet



Properties	Kao-Tuff FS Gun	
<b>Bulk Density, kg/m<sup>3</sup> (pcf), ASTM C134</b>		
	dried 24 hours @ 105°C (220°F)	1906-2082 (121-130)
	fired 5 hours @ 816°C (1500°F)	1890-2066 (118-129)
<b>Modulus of Rupture, MPa (psi), ASTM C133</b>		
	dried 24 hours @ 105°C (220°F)	4.1-7.6 (600-1100)
	fired 5 hours @ 816°C (1500°F)	3.4-6.2 (500-900)
<b>Cold Crushing Strength, MPa (psi), ASTM C133</b>		
	dried 24 hours @ 105°C (220°F)	34.5-58.6 (5000-8500)
	fired 5 hours @ 816°C (1500°F)	31.0-55.2 (4500-8000)
<b>Permanent Linear Change, %, ASTM C113</b>		
	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)	-0.2 to -0.5
<b>Abrasion loss, cm<sup>3</sup>, ASTM C704</b>		
	fired 5 hours @ 816°C (1500°F)	13-23
<b>Chemical Analysis, %, Calcined Basis</b>		
	Alumina, Al <sub>2</sub> O <sub>3</sub>	22
	Silica, SiO <sub>2</sub>	74
	Iron Oxide, Fe <sub>2</sub> O <sub>3</sub>	0.4
	Titania, TiO <sub>2</sub>	0.4
	Lime, CaO	2.5
	Magnesia, MgO	0.1
	Alkali as, Na <sub>2</sub> O + K <sub>2</sub> O	0.1
<b>Thermal Conductivity, W.m•K (BTU•in/hr•ft<sup>2</sup>•°F), ASTM C417</b>		
	260°C (500°F)	1.21 (8.4)
	538°C (1000°F)	1.34 (9.3)
	816°C (1500°F)	1.41 (9.8)
	1093°C (2000°F)	1.43 (9.9)

### 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 9 months from date of manufacture when properly stored.

Whilst the values and application information in this datasheet are typical, they are given for guidance only. The values and the information given are subject to normal manufacturing variation and may be subject to change without notice. Morgan Advanced Materials – Thermal Ceramics makes no guarantees and gives no warranties about the suitability of a product and you should seek advice to confirm the product's suitability for use with Morgan Advanced Materials - Thermal Ceramics.