

## Tri-Mor® Kaolite® 2800, 3000, 3300



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### Product Description

Kaolite 2800 is a general-purpose insulating castable for use at temperatures up to 2800°F (1538°C). It may be cast or gunited in place. It contains a high-purity, calcium-aluminate cement for improved strength and volume stability.

Kaolite 3000 is a lightweight 60% alumina insulating castable for use up to 3000°F (1649°C) that is specifically designed for casting. This mix utilizes a high-purity calcium-aluminate cement that is specifically chosen for its guniting characteristics.

Kaolite 3300 is a high strength bubble alumina, lightweight castable with a high-purity binder. Kaolite 3300 is recommended for transfer lines to secondary ammonia reformers, and other applications where resistance to hydrogen atmospheres and silica pickup is critical.

### Features

- Low thermal conductivity
- Reduction of the quantity of heat storage and heat transfer produce significant savings in fuel consumption
- Temperature range up to 3300°F (1816°C)

### Instructions For Using

Highest strength is obtained with castable refractory by using the least amount of clean mixing water which will allow thorough working of material into place with a vibrator or by rodding. A mechanical mixer is required for proper placement (paddle-type mortar mixers are best suited). After adding the recommended amount of water to achieve a ball-in-hand consistency, mix for 3 minutes. Place material within 30 minutes after mixing.

### Precautions

Store bagged castables in a dry place, off the ground and, when possible, with the original shrink wrapping intact.

Watertight forms must be used when placing material. All porous surfaces that will come in contact with the material must be waterproofed with a suitable coating or membrane.

For maximum strength, cure 24 hours under damp conditions before initial heat-up. Keep freshly placed castable warm during cold weather, ideally between 50°F and 80°F (21°C to 27°C) until wet curing is complete.

New castable installations must be heated slowly the first time.

Freshly placed lightweight castable are prone to a deteriorating condition called alkali hydrolysis when they are kept in a non-dried state for a sustained period of time. Under these conditions, the castable should be force-dried soon after placement to help retard the possible deterioration effects.

**Tri-Mor<sup>®</sup> Kaolite<sup>®</sup> 2800, 3000, 3300**


Properties <sup>3</sup>	2800	3000	3300
Recommended use limit, °F (°C)	2800 (1538)	3000 (1649)	3300 (1815)
Pounds req. to place one cubic ft <sup>1</sup> (kg)	96 (44)	104 (47)	98 (44)
Method of installation	cast/gun	cast	cast
Water ranges, % by weight, recommended <sup>2</sup>			
casting (by vibrating)	18 - 24	14 - 20	11 - 13
Density, fired, @ 1500°F (816°C) pcf (kg/m <sup>3</sup> )	89 - 104 (1426 - 1666)	98 - 111 (1570 - 1778)	94 - 105 (1505 - 1682)
Pounds per bag (kg)	50 (23)	50 (23)	50 (23)
Shelf life, months	12	12	12
Modulus of rupture, ASTM C 133, psi (Mpa)			
dried 24 hrs. @ 220°F (104°C)	300 - 500 (2.06 - 3.44)	250 - 550 (1.55 - 3.79)	600 - 1100 (4.14 - 7.58)
fired 5 hrs. @ 1500°F (816°C)	275 - 500 (1.89 - 3.44)	175 - 350 (1.21 - 2.41)	500 - 900 (3.44 - 6.21)
fired 5 hrs. @ use limit	600 - 1000 (4.14 - 6.89)	400 - 800 (2.76 - 5.52)	900 - 1700 (3.44 - 11.72)
Cold crushing strength, psi (Mpa)			
dried 24 hrs. @ 220°F (104°C)	900 - 1800 (6.21 - 12.41)	900 - 1700 (6.21 - 11.72)	2000 - 3500 (13.79 - 24.13)
fired 5 hrs. @ 1500°F (816°C)	900 - 1800 (6.21 - 12.41)	800 - 1500 (5.51 - 10.34)	1600 - 3000 (11.03 - 20.68)
fired 5 hrs. @ use limit	1200 - 2500 (8.27 - 17.24)	1200 - 2200 (8.27 - 15.17)	2500 - 4000 (17.24 - 27.58)
Permanent linear change, % (ASTM C 113) <sup>4</sup>			
dried 24 hrs. @ 220°F (104°C)	0 to -0.2	0 to -0.2	0 to -0.2
fired 5 hrs. @ 1500°F (816°C)	-0.4 to -0.9	-0.1 to -0.3	-0.1 to -0.3
fired 5 hrs. @ use limit	-1.0 to +1.0	-1.0 to -2.5	0 to -0.6
<b>Chemical Analysis, %, Weight basis after firing</b>			
Alumina, Al <sub>2</sub> O <sub>3</sub>	55	57	94
<sup>5</sup> Silica, SiO <sub>2</sub>	34	35	0.5
Ferric oxide, Fe <sub>2</sub> O <sub>3</sub>	0.9	1.0	0.1
Titanium oxide, TiO <sub>2</sub>	1.8	2.0	-
Calcium oxide, CaO	5.9	4.5	4.6
Magnesium oxide, MgO	0.2	0.2	0.1
Alkalies, as, Na <sub>2</sub> O	1.1	0.8	0.4
<b>Thermal Conductivity, BTU·in./hr·ft<sup>2</sup>·°F (W/m·k), ASTM C 417</b>			
Mean temperature @ 500°F (260°C)	3.4 (0.49)	3.6* (0.52)	9.9 (1.43)
@ 1000°F (538°C)	3.7 (0.53)	3.7 (0.53)	8.2 (1.18)
@ 1500°F (816°C)	3.9 (0.56)	3.9 (0.56)	7.4 (1.07)
@ 2000°F (1093°C)	4.2 (0.61)	4.3 (0.62)	7.5 (1.08)
@ 2500°F (1371°C)	4.5 (0.64)	4.8 (0.69)	8.0 (1.15)

\* Thermal conductivity for Kaolite 3000 is estimated.

1. Gunitite installation may require 10-30% overage due to rebound and on-site loss.
2. Water requirements indicated are offered as a guide. Actual water required may be subject to field conditions.
3. Properties indicated are for vibratory cast materials only unless specified otherwise.
4. Fired linear change values reflect samples taken from a dried to fired state.
5. If spec value on SiO<sub>2</sub> required, then need to request Kaolite 3300-LS.

Compliance data sheets for specific applications or job requirements are available upon request.

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 Morgan Advanced Materials office to obtain current information.