



Super lightweight Kaolite castables reduce both the quantity of heat storage and heat transfer through the lining producing significant savings in furnace fuel consumption. The lower densities of these vermiculite based Kaolite castables reduce the amount of supporting furnace steel work required and provide more insulation with a thinner lining. These products can be cast, poured, or gunited.

**Kaolite 1600** is a super lightweight, low thermal conductivity vermiculite based castable designed for backup insulation up to 1600°F. Kaolite 1600 contains portland cement which limits use temperature to 1600°F; however, this makes it an economical product based on cost per cubic foot.

**Kaolite 1800** is a super lightweight, low thermal conductivity vermiculite castable designed for both backup insulation and some hot face applications up to 1800°F. Kaolite 1800 contains a calcium-aluminate cement which gives it better high-temperature stability when compared to Kaolite 1600. Typical applications would be low-temperature lining for ovens and ductwork lining.

### Instructions For Using

#### Casting

Highest strength is obtained with castable refractory by using the least amount of clean mixing water. This will allow thorough working of material into place by lightly vibrating or rodding. A mechanical mixer is required for proper placement (paddle-type mortar mixers are best suited). After achieving a ball-in-hand consistency, mix for 6 minutes. Place material within 20 minutes after mixing.

#### Gunning

Use suitable gunite equipment. Material should be predampened uniformly with approximately 10 - 12% by weight of clean water in mechanical mixer before placing into gun. This will reduce rebound and dust. Add required water at nozzle for effective placement. Suggested air pressure at the nozzle is between 15 and 25 psi.

#### 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 into 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 70°F and 80°F. New castable installations must be heated slowly the first time. Freshly placed lightweight castables are prone to a deteriorating condition called alkali hydrolysis when they are kept in a non-dried state for a sustained period of time in a warm, humid environment. Under these conditions, the castables should be force dried soon after placement or coated with Kao-Seal to resist the possible deterioration effects.

For mor information on castable placement, consult your Thermal Ceramics representative.

Physical Properties <sup>3</sup>	1600	1800
Recommended use limit, °F (°C)	1600 (871)	1800 (982)
Pounds per bag (kg)	50 (23)	50 (23)
Method of installation <sup>2</sup>	C, G, P	C, G, P
Shelf life, months	12	12

# Kaolite Super Lightweight Insulating Castables

## Product Information

### Physical Properties<sup>3</sup>

	1600	1800
Recommended Method of Application,	cast, gunned	cast, gunned
Average lb required to place one cubic ft <sup>1</sup> (kg)	23, 36* (10, 16)	23, 35* (10, 15)
Recommended water ranges, % by weight		
Casting (by vibrating)	120 - 145	145 - 165
Pouring	150 - 180	175 - 190
Recommended Temperature Use Limit, °F (°C)	1600 (871)	1800 (982)
Melting Point, °F (°C)	2300 (1260)	2400 (1316)
Density, pcf (kg/m <sup>3</sup> ) fired @ temp. use limit	20 - 25, 31 - 39 (320-400, 496-625)	20 - 25, 29 - 38 (320-400, 464-609)
Modulus of rupture, psi (Mpa) ASTM C 133		
dried 18-24 hrs. @ 220°F (104°C) cast	45 - 75 (0.31 - 0.52)	25 - 40 (0.01 - 0.27)
gunned	70 - 120 (0.48 - 0.83)	50 - 100 (0.34 - 0.69)
fired 5 hrs. @ 1500°F (816°C) cast	25 - 40 (0.17 - 0.28)	30 - 50 (0.21 - 0.34)
gunned	35 - 55 (0.24 - 0.38)	40 - 60 (0.27 - 0.41)
fired 5 hrs. @ temp. use limit, cast	25 - 40 (0.17 - 0.27)	25 - 40 (0.01 - 0.27)
gunned	35 - 50 (0.24 - 0.34)	35 - 55 (0.24 - 0.34)
Cold Crushing Strength, psi (Mpa)		
dried 18-24 hrs. @ 220°F (104°C) cast	80 - 120 (0.55 - 0.83)	35 - 50 (0.24 - 0.34)
gunned	125 - 175 (0.86 - 1.21)	70 - 120 (0.48 - 0.83)
fired 5 hrs. @ 1500°F (816°C) cast	50 - 70 (0.34 - 0.48)	50 - 80 (0.34 - 0.55)
gunned	90 - 120 (0.62 - 0.83)	80 - 110 (0.55 - 0.76)
fired 5 hrs. @ use limit, cast	50 - 70 (0.34 - 0.48)	40 - 60 (0.27 - 0.41)
gunned	90 - 120 (0.62 - 0.83)	60 - 80 (0.41 - 0.55)
Perm. Linear Change, %, ASTM C 113 <sup>4</sup>		
fired 5 hrs. @ 1500°F (816°C)	-1.0 to -2.0	-0.5 to -1.5
fired 5 hrs. @ temp. use limit	-1.5 to -2.5	-1.5 to -2.5

### Chemical Analysis, %, Weight basis after firing

Alumina, Al <sub>2</sub> O <sub>3</sub>	11	29
Silica, SiO <sub>2</sub>	33	32
Ferric oxide, Fe <sub>2</sub> O <sub>3</sub>	7.9.	7.0
Titanium oxide, TiO <sub>2</sub>	1.4	2.3
Calcium oxide, CaO	30	14
Magnesium oxide, MgO	12.1	12
Alkalies, as, Na <sub>2</sub> O	3.7	3.5

### Thermal Conductivity, Btu•in./hr•ft<sup>2</sup>•°F (w/m•k), ASTM C 417

Mean temperature	cast, gunned	cast, gunned
@ 500°F (260°C)	0.87 (0.13), 1.03 (0.15)	0.79 (0.11), 0.93 (0.13)
@ 1000°F (538°C)	1.02 (0.15), 1.11 (0.16)	0.95 (0.14), 1.06 (0.15)
@ 1500°F (816°C)	1.16 (0.17), 1.20 (0.17)	1.11 (0.16), 1.26 (0.18)

\*Note: For overhead gunning applications, pounds required to place one ft<sup>3</sup> should be increased to 40-50 pcf. Does not include rebound loss.

1. Gunite installation may require 10-30% overage due to rebound and on-site loss.

2. Installation key: C-cast, G-gun, P-pour

3. Properties indicated are for vibratory cast materials unless specified otherwise.

4. Fired linear change values reflect samples taken from a dried to fired state.

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

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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.

#### Marketing Communications Offices

##### Thermal Ceramics Americas

T: +1 (706) 796 4200  
F: +1 (706) 796 4398

##### Thermal Ceramics Asia Pacific

T: +65 6733 6068  
F: +65 6733 3498

##### Thermal Ceramics Europe

T: +44 (0) 151 334 4030  
F: +44 (0) 151 334 1684

#### North America - Sales Offices

##### Canada

T: +1 (905) 335 3414  
F: +1 (905) 335 5145

##### Mexico

T: +52 (555) 576 6622  
F: +52 (555) 576 3060

##### United States of America

Eastern Region  
T: +1 (800) 338 9284 F: +1 (866) 785 2764

#### Western Region

T: +1 (866) 785 2738 F: +1 (866) 785 2760

#### South America - Sales Offices

##### Argentina

T: +54 (11) 4373 4439  
F: +54 (11) 4372 3331

##### Brazil

T: +55 (21) 2418 1366  
F: +55 (21) 2418 1205

#### Chile

T: +56 (2) 854 1064  
F: +56 (2) 854 1952

#### Colombia

T: +57 (2) 2282935/2282803/2282799  
F: +57 (2) 2282935/2282803/23722085

#### Guatemala

T: +50 (2) 4733 295/6

F: +50 (2) 4730 601

#### Venezuela

T: +58 (241) 878 3164  
F: +58 (241) 878 6712