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 more information on castable placement, consult your Thermal Ceramics representative.

### Physical Properties

<table>
<thead>
<tr>
<th></th>
<th>1600</th>
<th>1800</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recommended use limit, °F (°C)</td>
<td>1600 (871)</td>
<td>1800 (982)</td>
</tr>
<tr>
<td>Pounds per bag (kg)</td>
<td>50 (23)</td>
<td>50 (23)</td>
</tr>
<tr>
<td>Method of installation</td>
<td>C, G, P</td>
<td>C, G, P</td>
</tr>
<tr>
<td>Shelf life, months</td>
<td>12</td>
<td>12</td>
</tr>
</tbody>
</table>
# Kaolite Super Lightweight Insulating Castables

## Product Information

### Physical Properties

**Recommended Method of Application,**
cast, gunned

**Average lb required to place one cubic ft** (kg)
23, 36* (10.16)

**Recommended water ranges, % by weight**

- **Casting (by vibrating):**
  - 120 - 145
  - 150 - 180

- **Pouring:**
  - 1600 (871)
  - 2300 (1260)

**Recommended Temperature Use Limit, °F (°C)**

- 1600 (871)
- 1800 (982)

**Melting Point, °F (°C)**

- 2300 (1260)
- 2400 (1316)

**Density,pcf (kg/m³)**

- Fired @ temp. use limit 20 - 25, 31 - 39 (320-400, 496-625)

**Modulus of rupture, psi (Mpa)**

- **Dried 18-24 hrs. @ 220°F (104°C)**
  - Cast: 45 - 75 (0.31 - 0.52)
  - Gunned: 70 - 120 (0.48 - 0.83)

- **Fired 5 hrs. @ 1500°F (816°C)**
  - Cast: 25 - 40 (0.17 - 0.27)
  - Gunned: 35 - 55 (0.24 - 0.38)

**Cold Crushing Strength, psi (Mpa)**

- **Dried 18-24 hrs. @ 220°F (104°C)**
  - Cast: 80 - 120 (0.55 - 0.83)
  - Gunned: 150 - 220 (0.86 - 1.21)

- **Fired 5 hrs. @ 1500°F (816°C)**
  - Cast: 50 - 70 (0.34 - 0.48)
  - Gunned: 90 - 120 (0.62 - 0.83)

**Perm. Linear Change, %, ASTM C 113**

<table>
<thead>
<tr>
<th>Temperature</th>
<th>Cast</th>
<th>Gunned</th>
</tr>
</thead>
<tbody>
<tr>
<td>1500°F (816°C)</td>
<td>-1.0 to -2.0</td>
<td>-0.5 to -1.5</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Component</th>
<th>Cast</th>
<th>Gunned</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alumina, Al₂O₃</td>
<td>11</td>
<td>29</td>
</tr>
<tr>
<td>Silica, SiO₂</td>
<td>33</td>
<td>32</td>
</tr>
<tr>
<td>Ferric oxide, Fe₂O₃</td>
<td>7.9</td>
<td>7.0</td>
</tr>
<tr>
<td>Titanium oxide, TiO₂</td>
<td>1.4</td>
<td>2.3</td>
</tr>
<tr>
<td>Calcium oxide, CaO</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Magnesium oxide, MgO</td>
<td>3.7</td>
<td>3.5</td>
</tr>
</tbody>
</table>

**Thermal Conductivity, Btu•in./hr•ft•°F (w/m•k), ASTM C 417**

<table>
<thead>
<tr>
<th>Temperature</th>
<th>Cast</th>
<th>Gunned</th>
</tr>
</thead>
<tbody>
<tr>
<td>500°F (260°C)</td>
<td>1.02 (0.15), 1.11 (0.16)</td>
<td>0.95 (0.14), 1.06 (0.15)</td>
</tr>
<tr>
<td>1000°F (538°C)</td>
<td>1.16 (0.17), 1.20 (0.17)</td>
<td>1.11 (0.16), 1.26 (0.18)</td>
</tr>
</tbody>
</table>

*Note: For overhead gunning applications, pounds required to place one ft³ 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. Fire 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 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.

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