شرکت سرامیک صنعت آفاق

تولیدکننده سرامیک های مهندسی دما بالا
تأمین مواد اولیه و تجهیزات صنایع پتروشیمی، فولاد و سرامیک

- Manufacturing UHT Ceramics
- Provision of Raw Materials & Equipment for Petrochemical, Steel & Ceramic Industries
خدمات مشاوره‌ای صنعت سرامیک آفاق

آنالیز مواد و خدمات آزمایشگاهی
مشاوره فنی در ساخت و تامین قطعات
سرامیکی صنایع فولاد و هیدروشیمی
طراحی و ساخت تجهیزات و ماشین آلات
صنایع سرامیک
طراحی فرمولاسیون سرامیک های
مهندسی
طراحی فرمولاسیون لعاب و بدنه انواع
کاشی و سرامیک
شرکت سرامیک صنعت آفاق با هدف تجاری سازی علم و دانش و یافته‌های پژوهشی و تحقیقاتی در حوزه مواد دیرکداز و سرامیکهای مهندسی در سال ۱۳۸۸ تاسیس و با بهره‌گیری از کادری مجری و نیروی مهندسی متخصص و به منظور کاهش وابستگی کشور به واردات فلزات و مواد اولیه، آغاز به طراحی، ساخت و تولید انواع قطعات سرامیکی مهندسی دما بالا و تامین مواد اولیه مورد نیاز صنایع کشور نموده است.
محصولات و خدمات شرکت سرامیک صنعت آفاق

1- قطعات مورد نیاز صنایع نفت و گاز، پتروشیمی، پلاستیک و نیروگاهی

- انواع قطعات دیگرگوناژ مقاوم به شوک حرارتی و ضد اسید و خوردگی از جمله فرولهای آلومینایی، زیرکونیایی و ... در اشكال مختلف، انواع جرم های ریختنی آلومینیایی

<table>
<thead>
<tr>
<th>Product</th>
<th>Size</th>
<th>Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>انواع فرولهای سرامیک آلومینایی و زیرکونیایی</td>
<td>در سایز ها و ابعاد مختلف</td>
<td>اتصال مهو موم مسیرهای جریان سیال، انتقال گاز جلوگیری از خوردگی</td>
</tr>
<tr>
<td>Properties</td>
<td>Zirconia Insert</td>
<td>Body</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>----------------</td>
<td>-------</td>
</tr>
<tr>
<td>Apparent Porosity (%)</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>Bulk Density ($g/cm^3$)</td>
<td>5.4</td>
<td>2.8</td>
</tr>
<tr>
<td>Chemical Analysis (%)</td>
<td>$ZrO_2$ 96.5</td>
<td>$Al_2O_3$ 75</td>
</tr>
<tr>
<td></td>
<td>$MgO$ 3.21</td>
<td>C 25</td>
</tr>
</tbody>
</table>

- **نالز درونی پایتیل (Ladle Nozzle)**

<table>
<thead>
<tr>
<th>Properties</th>
<th>Ladle Nozzle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apparent Porosity (%)</td>
<td>8.5</td>
</tr>
<tr>
<td>Bulk Density ($g/cm^3$)</td>
<td>2.5</td>
</tr>
<tr>
<td>Chemical Analysis (%)</td>
<td>$Al_2O_3$ 84</td>
</tr>
<tr>
<td></td>
<td>C 9</td>
</tr>
</tbody>
</table>

- **نالز بیرونی (Collector Nozzle)**

<table>
<thead>
<tr>
<th>Properties</th>
<th>Collector Nozzle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apparent Porosity (%)</td>
<td>6</td>
</tr>
<tr>
<td>Bulk Density ($g/cm^3$)</td>
<td>2.9</td>
</tr>
<tr>
<td>Chemical Analysis (%)</td>
<td>$Al_2O_3$ 84</td>
</tr>
<tr>
<td></td>
<td>C 9</td>
</tr>
</tbody>
</table>
انواع چسب های نسوز

۵ بوشی سطح در محیط هایی با حرارت بالا ۵ افزایش مقاومت سطح
۵ افزایش مقاومت نسبت به نفوذ هوا

<table>
<thead>
<tr>
<th>Chemical Properties</th>
<th>HT-1</th>
<th>HT-2</th>
<th>HT-3</th>
</tr>
</thead>
<tbody>
<tr>
<td>$Al_2O_3$ (%)</td>
<td>29.2</td>
<td>32</td>
<td>45</td>
</tr>
<tr>
<td>$SiO_2$ (%)</td>
<td>64.6</td>
<td>61.9</td>
<td>49.2</td>
</tr>
<tr>
<td>$Fe_2O_3$ (%)</td>
<td>1.65</td>
<td>1.2</td>
<td>1.1</td>
</tr>
<tr>
<td>TiO$_2$ (%)</td>
<td>1.35</td>
<td>1.3</td>
<td>1.1</td>
</tr>
<tr>
<td>CaO+K$_2$O (%)</td>
<td>2.9</td>
<td>2.6</td>
<td>2.4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Physical Properties</th>
<th>Density $[kg/m^3]$</th>
<th>Temperature Limit $^\circ C$</th>
<th>Viscosity Adjustment Liquid</th>
<th>Delivered condition</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1700</td>
<td>1265</td>
<td>Water</td>
<td>Ready to use</td>
</tr>
<tr>
<td></td>
<td>1700</td>
<td>1450</td>
<td>Water</td>
<td>Ready to use</td>
</tr>
<tr>
<td></td>
<td>1800</td>
<td>1580</td>
<td>Water</td>
<td>Ready to use</td>
</tr>
</tbody>
</table>
Ceramic Cuplock

<table>
<thead>
<tr>
<th>Chemical Properties</th>
<th>CL-1</th>
<th>CL-2</th>
<th>CL-3</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\text{Al}_2\text{O}_3$ (%)</td>
<td>$&gt;50$</td>
<td>$&gt;75$</td>
<td>$&gt;90$</td>
</tr>
<tr>
<td>$\text{SiO}_2$ (%)</td>
<td>$&lt;45$</td>
<td>$&lt;20$</td>
<td>$&lt;5$</td>
</tr>
<tr>
<td>$\text{Fe}_2\text{O}_3$ (%)</td>
<td>$&lt;2$</td>
<td>$&lt;1.5$</td>
<td>$&lt;1$</td>
</tr>
<tr>
<td>$\text{TiO}_2$ (%)</td>
<td>$&lt;1.5$</td>
<td>$&lt;1.5$</td>
<td>$&lt;1.5$</td>
</tr>
<tr>
<td>Max. Service Temp.</td>
<td>$1350 , ^\circ\text{C}$</td>
<td>$1450 , ^\circ\text{C}$</td>
<td>$1600 , ^\circ\text{C}$</td>
</tr>
<tr>
<td>Density ($\text{g/cm}^3$)</td>
<td>$2.2-2.6$</td>
<td>$2.2-2.7$</td>
<td>$2.7-3.3$</td>
</tr>
</tbody>
</table>

物理性质

Pouring Cup

<table>
<thead>
<tr>
<th>Product</th>
<th>Chemical Analysis (%)</th>
<th>B.D. ($\text{g/cm}^3$)</th>
<th>A.P. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pouring Cup</td>
<td>$\text{Al}_2\text{O}_3$ 85</td>
<td>$3.2-3.4$</td>
<td>$&gt;1.5$</td>
</tr>
</tbody>
</table>
لوله‌های خاص آلومینیایی

<table>
<thead>
<tr>
<th>Product</th>
<th>Chemical Analysis (%)</th>
<th>B.D. (g/cm³)</th>
<th>A.P. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Closed-ended Tube</td>
<td>Al₂O₃ 70</td>
<td>3.2-3.4</td>
<td>7</td>
</tr>
<tr>
<td>Alumina Ceramic Pipe</td>
<td>Al₂O₃ 70</td>
<td>3.2-3.4</td>
<td>8</td>
</tr>
</tbody>
</table>

قطعات مختلف از جنس Si₃N₄

SiC, BN, B₄C, Si₃N₄
گلوله‌های سرامیکی (Ball Mills)

<table>
<thead>
<tr>
<th>Product</th>
<th>Chemical Analysis (%)</th>
<th>B.D. (g/cm³)</th>
<th>Size (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ball Mills</td>
<td>Al₂O₃ 92</td>
<td>3.7</td>
<td>15-20-25-30-35-45-50-60</td>
</tr>
</tbody>
</table>

لاینرهای سرامیکی (Ceramic Liners)

<table>
<thead>
<tr>
<th>Product</th>
<th>Chemical Analysis (%)</th>
<th>B.D. (g/cm³)</th>
<th>Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ceramic Liner</td>
<td>Al₂O₃ 92</td>
<td>3.65</td>
<td>Ball Mill internal lining</td>
</tr>
</tbody>
</table>

حلقه‌های سرامیکی (Ceramic Rings)

<table>
<thead>
<tr>
<th>Product</th>
<th>Chemical Analysis (%)</th>
<th>B.D. (g/cm³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ceramic ring</td>
<td>Al₂O₃ 99</td>
<td>3.9</td>
</tr>
</tbody>
</table>
### Ceramic Foam Filters & High-Temperature Honeycomb Ceramic Filters

<table>
<thead>
<tr>
<th>Product</th>
<th>Chemical Analysis</th>
<th>A.P. (%)</th>
<th>B.D. (g/cm³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ceramic Filters</td>
<td>SiC</td>
<td>8-40</td>
<td>0.55±0.1</td>
</tr>
<tr>
<td></td>
<td>ZrO₂</td>
<td>8-20</td>
<td>1.3±0.1</td>
</tr>
<tr>
<td></td>
<td>Al₂O₃</td>
<td>10-60</td>
<td>0.45±0.1</td>
</tr>
</tbody>
</table>

#### Particulars

<table>
<thead>
<tr>
<th>Particulars</th>
<th>Units</th>
<th>Al₂O₃ 75%</th>
<th>Al₂O₃ 85%</th>
<th>Al₂O₃ 95%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Density</td>
<td>g/cm³</td>
<td>≥3.35</td>
<td>≥3.62</td>
<td>≥3.8</td>
</tr>
<tr>
<td>Porosity</td>
<td>%</td>
<td>Nil</td>
<td>Nil</td>
<td>Nil</td>
</tr>
<tr>
<td>Color</td>
<td></td>
<td>White</td>
<td>White</td>
<td>White</td>
</tr>
<tr>
<td>MOR</td>
<td>kg/cm³</td>
<td>≥2200</td>
<td>2200-2500</td>
<td>2500-2800</td>
</tr>
<tr>
<td>CCS</td>
<td>kg/cm³</td>
<td>≥3300</td>
<td>2500-4000</td>
<td>≥4000</td>
</tr>
<tr>
<td>Hardness</td>
<td>Mohs</td>
<td>≥8</td>
<td>≥9</td>
<td>≥9</td>
</tr>
<tr>
<td>Co-efficient of Thermal Expansion</td>
<td>x 10⁻⁶/Deg. °C</td>
<td>7</td>
<td>7.6</td>
<td>8</td>
</tr>
<tr>
<td>Max Use Temp</td>
<td>Deg. °C</td>
<td>1300</td>
<td>1400</td>
<td>1650</td>
</tr>
<tr>
<td>Particulars</td>
<td>Units</td>
<td>ZrO$_2$ 95%</td>
<td>ZrO$_2$ 85%</td>
<td>ZrO$_2$ 75%</td>
</tr>
<tr>
<td>--------------------------</td>
<td>-------</td>
<td>-------------</td>
<td>-------------</td>
<td>-------------</td>
</tr>
<tr>
<td>Density</td>
<td>g/cm$^3$</td>
<td>6</td>
<td>5.85</td>
<td>5.2</td>
</tr>
<tr>
<td>Porosity</td>
<td>(%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Color</td>
<td></td>
<td>Ivory</td>
<td>Ivory</td>
<td>Ivory</td>
</tr>
<tr>
<td>MOR</td>
<td>Kg/cm$^2$</td>
<td>2000</td>
<td>&gt;2200</td>
<td>2200-2500</td>
</tr>
<tr>
<td>CCS</td>
<td>Kg/cm$^2$</td>
<td>3000</td>
<td>&gt;3300</td>
<td>2500-4000</td>
</tr>
<tr>
<td>Hardness</td>
<td>HRA</td>
<td>1850</td>
<td>1800</td>
<td>1800</td>
</tr>
<tr>
<td>Co-efficient of Thermal Expansion</td>
<td>x10$^{-6}$/Deg. $^\circ$C</td>
<td>10.2</td>
<td>10.1</td>
<td>10</td>
</tr>
<tr>
<td>Max Use Temp</td>
<td>Deg.$^\circ$C</td>
<td>1850</td>
<td>1650</td>
<td>1550</td>
</tr>
</tbody>
</table>
۱- تامین مواد اولیه مورد نیاز صنایع فولاد، ذوب و ریخته گری

MASHE MERA (EBT Sand)

<table>
<thead>
<tr>
<th>Element</th>
<th>MgO</th>
<th>SiO₂</th>
<th>Fe₂O₃</th>
<th>CaO</th>
<th>Al₂O₃</th>
<th>Grain Size (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>%</td>
<td>45-60</td>
<td>38-42</td>
<td>7-9</td>
<td>0-0.5</td>
<td>0-0.4</td>
<td>2-6</td>
</tr>
</tbody>
</table>

(Tundish Ramming Mass)

جرم روشک تاندیش

<table>
<thead>
<tr>
<th>Chemical Properties</th>
<th>Mgo</th>
<th>SiO₂</th>
<th>Al₂O₃</th>
<th>CaO</th>
<th>FeO</th>
<th>LOI (Organic)</th>
</tr>
</thead>
<tbody>
<tr>
<td>%</td>
<td>70-75</td>
<td>10-12</td>
<td>&lt;5%</td>
<td>&lt;3%</td>
<td>&lt;1%</td>
<td>3-5%</td>
</tr>
</tbody>
</table>

Physical Properties: Application Temp 1650 ºC, Density (\(\frac{Gr}{cm^3}\)) >2.3, Application practice cold.
### Furnace Gunning Mass

<table>
<thead>
<tr>
<th>Chemical Properties</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>MgO</td>
<td>78-82 %</td>
</tr>
<tr>
<td>SiO₂</td>
<td>5-7 %</td>
</tr>
<tr>
<td>Al₂O₃</td>
<td>&lt;1.5 %</td>
</tr>
<tr>
<td>CaO</td>
<td>&lt;3.5 %</td>
</tr>
<tr>
<td>Fe₂O₃</td>
<td>&lt;2 %</td>
</tr>
<tr>
<td>LOI (Organic)</td>
<td>&lt;2 %</td>
</tr>
<tr>
<td>Application Temp</td>
<td>Up to 1650</td>
</tr>
<tr>
<td>Density (Gr/cm³)</td>
<td>&gt;1.65</td>
</tr>
<tr>
<td>Grain size (mm)</td>
<td>0-0.6</td>
</tr>
<tr>
<td>Porosity (%)</td>
<td>&gt;18</td>
</tr>
<tr>
<td>Water Requirement</td>
<td>18-20 %</td>
</tr>
</tbody>
</table>

### Green Mortar

<table>
<thead>
<tr>
<th>Chemical Properties</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Al₂O₃</td>
<td>≥88 %</td>
</tr>
<tr>
<td>SiO₂</td>
<td>≤4.5 %</td>
</tr>
<tr>
<td>Fe₂O₃</td>
<td>≤0.5 %</td>
</tr>
<tr>
<td>CaO</td>
<td>≤0.25 %</td>
</tr>
<tr>
<td>Cr₂O₃</td>
<td>≤6-7 %</td>
</tr>
</tbody>
</table>

### Ladle Filler Sand

<table>
<thead>
<tr>
<th>Density (Gr/cm³)</th>
<th>Moisture (Wt.%)</th>
<th>C (Wt.%)</th>
<th>SiO₂ (Wt.%)</th>
<th>Cr₂O₃ (Wt.%)</th>
<th>Softening Point (°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1-2.4</td>
<td>&lt;0.5</td>
<td>0.5-1</td>
<td>15-18</td>
<td>38-42</td>
<td>&gt;1700</td>
</tr>
</tbody>
</table>
### Casting Powder

<table>
<thead>
<tr>
<th>Chemical Properties</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>CaO</td>
<td>26-28 %</td>
</tr>
<tr>
<td>MgO</td>
<td>2-3 %</td>
</tr>
<tr>
<td>Al₂O₃</td>
<td>12-15 %</td>
</tr>
<tr>
<td>Na₂O₃</td>
<td>3.5-5 %</td>
</tr>
<tr>
<td>SiO₂</td>
<td>24-26 %</td>
</tr>
<tr>
<td>Fe₂O₃</td>
<td>1-3 %</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Physical Properties</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basicity</td>
<td>0.9-1.2 %</td>
</tr>
<tr>
<td>Softening Point °C</td>
<td>1150-1170</td>
</tr>
<tr>
<td>Fluidity Point °C</td>
<td>1210-1220</td>
</tr>
<tr>
<td>Grain Size (Mesh)</td>
<td>-150</td>
</tr>
<tr>
<td>Steel Grade</td>
<td>Low Carbon</td>
</tr>
<tr>
<td>Melting point °C</td>
<td>1190-1200</td>
</tr>
<tr>
<td>Viscosity (Pa.s) at 1300 °C</td>
<td>1.3</td>
</tr>
<tr>
<td>Casting Speed (m/min)</td>
<td>1-3</td>
</tr>
</tbody>
</table>

### Chromite Sand

<table>
<thead>
<tr>
<th>Chemical Properties</th>
<th>Ch-1</th>
<th>Ch-2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cr₂O₃ (%)</td>
<td>≥53.2</td>
<td>≥54</td>
</tr>
<tr>
<td>MgO (%)</td>
<td>≤21.12</td>
<td>≤20.12</td>
</tr>
<tr>
<td>Fe₂O₃ (%)</td>
<td>≤18.53</td>
<td>≤19.53</td>
</tr>
<tr>
<td>Al₂O₃ (%)</td>
<td>≤3.96</td>
<td>≤4.96</td>
</tr>
<tr>
<td>SiO₂ (%)</td>
<td>≤3.21</td>
<td>≤2.21</td>
</tr>
<tr>
<td>Moisture</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Physical Properties</th>
<th>Ch-1</th>
<th>Ch-2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shape</td>
<td>Semi-round</td>
<td>Semi-round</td>
</tr>
<tr>
<td>Grain Size</td>
<td>0-0.7 mm, 0.2-0.7 mm, More than 98%</td>
<td>0-0.7 mm, 0.2-0.7 mm, More than 98%</td>
</tr>
<tr>
<td>Flowability</td>
<td>36°</td>
<td>36°</td>
</tr>
<tr>
<td>Bulk Density (g/L/cm³)</td>
<td>4.6-4.8</td>
<td>4.6-4.8</td>
</tr>
</tbody>
</table>
### Ferrosilicon

<table>
<thead>
<tr>
<th>Product</th>
<th>Si (%)</th>
<th>Al (%)</th>
<th>C (%)</th>
<th>P (%)</th>
<th>S (%)</th>
<th>Origin</th>
</tr>
</thead>
<tbody>
<tr>
<td>FeSi</td>
<td>70-74</td>
<td>1.5-2</td>
<td>0.1</td>
<td>0.05</td>
<td>0.01</td>
<td>Iran</td>
</tr>
</tbody>
</table>

### Ferro Silico Manganese

<table>
<thead>
<tr>
<th>Product</th>
<th>Mn (%)</th>
<th>Si (%)</th>
<th>C (%)</th>
<th>P (%)</th>
<th>S (%)</th>
<th>Size (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FeSiMn</td>
<td>60-63</td>
<td>14</td>
<td>2</td>
<td>0.35</td>
<td>0.03</td>
<td>10-60 (90% Min)</td>
</tr>
</tbody>
</table>
### Ferro Manganese

<table>
<thead>
<tr>
<th>Product</th>
<th>Mn (%)</th>
<th>Si (%)</th>
<th>C (%)</th>
<th>P (%)</th>
<th>S (%)</th>
<th>Size (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FeMn (HC)</td>
<td>75</td>
<td>1.5 Max</td>
<td>6-8 Max</td>
<td>0.25 Max</td>
<td>0.03 Max</td>
<td>10-60 (90% Min)</td>
</tr>
</tbody>
</table>

![Ferro Manganese Image](image)

### Ferro Silico Magnesium

<table>
<thead>
<tr>
<th>Product</th>
<th>Mgo (%)</th>
<th>Al (%)</th>
<th>Mn (%)</th>
<th>Si (%)</th>
<th>Ca (%)</th>
<th>Mg (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FeSiMg</td>
<td>0.6</td>
<td>1.2</td>
<td>0.8-1</td>
<td>43-48</td>
<td>0.8-1.1</td>
<td>5-6.5</td>
</tr>
<tr>
<td></td>
<td>0.6</td>
<td>1.2</td>
<td>0.8-1</td>
<td>43-48</td>
<td>1.1-1.4</td>
<td>5-6.5</td>
</tr>
</tbody>
</table>

![Ferro Silico Magnesium Image](image)
### Ferrochrome

<table>
<thead>
<tr>
<th>Element %</th>
<th>Cr (%)</th>
<th>C (%)</th>
<th>Si (%)</th>
<th>P (%)</th>
<th>S (%)</th>
<th>Size (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FeCr (LC)</td>
<td>60</td>
<td>0.065</td>
<td>1 Max</td>
<td>0.025 Max</td>
<td>0.003 Max</td>
<td>10-50 (90% Min)</td>
</tr>
<tr>
<td>FeCr (HC)</td>
<td>63-65</td>
<td>6.8</td>
<td>2.8 Max</td>
<td>0.02 Max</td>
<td>0.03 Max</td>
<td>10-60 (90% Min)</td>
</tr>
</tbody>
</table>

### Graphite

<table>
<thead>
<tr>
<th>Element</th>
<th>FC</th>
<th>S</th>
<th>Ash</th>
<th>MOI</th>
<th>Size (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage</td>
<td>98.5</td>
<td>0.5 Max</td>
<td>0.5 Max</td>
<td>0.5 Max</td>
<td>1-5</td>
</tr>
<tr>
<td>Percentage</td>
<td>98.5</td>
<td>0.03-0.05 Max</td>
<td>0.5 Max</td>
<td>0.5 Max</td>
<td>1-5</td>
</tr>
</tbody>
</table>
### Chemical Properties

<table>
<thead>
<tr>
<th></th>
<th>SiO₂</th>
<th>Al₂O₃</th>
<th>Fe₂O₃</th>
<th>Fe₃O₄</th>
<th>CaO</th>
<th>MgO</th>
<th>Loss on Ignition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value</td>
<td>≥98</td>
<td>&lt;0.3</td>
<td>&lt;0.2</td>
<td>&lt;0.3</td>
<td>&lt;0.09</td>
<td>&lt;0.07</td>
<td>&lt;0.05</td>
</tr>
</tbody>
</table>

### Physical Properties

<table>
<thead>
<tr>
<th></th>
<th>Melting Point</th>
<th>Max Service Temp</th>
<th>Specific Gravity</th>
<th>Heat Transmission Coefficient</th>
<th>Grain Size</th>
<th>Bulk Density (Gr/Cm³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value</td>
<td>~1730°C</td>
<td>1700°C</td>
<td>2.3-2.4</td>
<td>4.5 × 10⁻⁶ in 200-1000°C</td>
<td>0-6 (mm)</td>
<td>≥2.3</td>
</tr>
</tbody>
</table>
- تامین مواد اولیه مورد نیاز شرکت های کاشی و سرامیک

پودرهای آلومینا آلфа، آلومینا بتا، آلومینا سیلیکات، آلومینا فرانسوسی، آلومینا آلمانی، آلومینا مولاپت، آلومینا کوردبیت، آلومینا فیوز و شاموت آلومینایی

### Aluminum Oxide Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compound Formula</td>
<td>Al₂O₃</td>
</tr>
<tr>
<td>Molecular Weight</td>
<td>101.96</td>
</tr>
<tr>
<td>Appearance</td>
<td>Solid</td>
</tr>
<tr>
<td>Melting Point</td>
<td>2072 °C</td>
</tr>
<tr>
<td>Boiling Point</td>
<td>2977 °C</td>
</tr>
<tr>
<td>Density</td>
<td>3.95 g/cm³</td>
</tr>
<tr>
<td>Solubility in H₂O</td>
<td>N/A</td>
</tr>
<tr>
<td>Exact Mass</td>
<td>101.984 g/mol</td>
</tr>
<tr>
<td>Monoisotopic Mass</td>
<td>101.947 Da</td>
</tr>
</tbody>
</table>

### MARTOXID

#### Chemical Properties

<table>
<thead>
<tr>
<th>Component</th>
<th>NR-42</th>
<th>MR-52</th>
<th>NR-70</th>
</tr>
</thead>
<tbody>
<tr>
<td>Al₂O₃</td>
<td>99.8%</td>
<td>99.8%</td>
<td>99.8%</td>
</tr>
<tr>
<td>Na₂O total</td>
<td>≤ 0.1</td>
<td>≤ 0.1</td>
<td>≤ 0.1</td>
</tr>
<tr>
<td>CaO</td>
<td>0.02%</td>
<td>0.04%</td>
<td>0.02%</td>
</tr>
<tr>
<td>Fe₂O₃</td>
<td>0.02%</td>
<td>0.03%</td>
<td>0.02%</td>
</tr>
<tr>
<td>SiO₂</td>
<td>0.05%</td>
<td>0.01%</td>
<td>0.08%</td>
</tr>
<tr>
<td>MgO</td>
<td>0.08%</td>
<td>0.08%</td>
<td>0.06%</td>
</tr>
<tr>
<td>α - Al₂O₃</td>
<td>≥ 95%</td>
<td>≥ 95%</td>
<td>≥ 95%</td>
</tr>
</tbody>
</table>

#### Physical Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>NR-42</th>
<th>MR-52</th>
<th>NR-70</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific Surface area (BET)</td>
<td>6.9 m²/g</td>
<td>6.9 m²/g</td>
<td>6-10 m²/g</td>
</tr>
<tr>
<td>Bulk Density</td>
<td>1100 kg/m³</td>
<td>1100 kg/m³</td>
<td>900 kg/m³</td>
</tr>
<tr>
<td>Water Absorption</td>
<td>13 ml/100 g</td>
<td>13 ml/100 g</td>
<td>20 ml/100 g</td>
</tr>
</tbody>
</table>
### MARTOXID

<table>
<thead>
<tr>
<th>Chemical Properties</th>
<th>KMS-96</th>
<th>KMS-98</th>
</tr>
</thead>
<tbody>
<tr>
<td>$Al_2O_3$ (%)</td>
<td>≈ 96</td>
<td>≈ 98</td>
</tr>
<tr>
<td>$Na_2O$ total (%)</td>
<td>≤ 0.1</td>
<td>≤ 0.1</td>
</tr>
<tr>
<td>CaO (%)</td>
<td>≈ 1.3</td>
<td>≈ 0.6</td>
</tr>
<tr>
<td>$Fe_2O_3$ (%)</td>
<td>≈ 0.1</td>
<td>≈ 0.1</td>
</tr>
<tr>
<td>$SiO_2$ (%)</td>
<td>≈ 1.9</td>
<td>≈ 1</td>
</tr>
<tr>
<td>MgO (%)</td>
<td>≈ 0.7</td>
<td>≈ 0.4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Physical Properties</th>
<th>Bulk Density ($kg/m^3$)</th>
<th>Moisture (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>≈ 1200</td>
<td>≤ 0.3</td>
</tr>
</tbody>
</table>

### Zirconium Oxide Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compound Formula</td>
<td>ZrO$_2$</td>
</tr>
<tr>
<td>Molecular Weight</td>
<td>123.22 g/mol</td>
</tr>
<tr>
<td>Appearance</td>
<td>Solid</td>
</tr>
<tr>
<td>Melting Point</td>
<td>2715 °C</td>
</tr>
<tr>
<td>Boiling Point</td>
<td>4300 °C</td>
</tr>
<tr>
<td>Density</td>
<td>5.68 g/cm$^3$</td>
</tr>
<tr>
<td>Solubility in H$_2$O</td>
<td>Negligible</td>
</tr>
<tr>
<td>Refractive Index</td>
<td>N20 / D 2.13</td>
</tr>
<tr>
<td>Thermal Conductivity</td>
<td>2.5-3 W/m·K</td>
</tr>
<tr>
<td>Thermal Expansion</td>
<td>10.5 × 10$^{-6}$ °C</td>
</tr>
<tr>
<td>Exact Mass</td>
<td>121.895 g/mol</td>
</tr>
<tr>
<td>Monoisotopic Mass</td>
<td>121.8945 Da</td>
</tr>
</tbody>
</table>
### Chemical Properties

<table>
<thead>
<tr>
<th>Product</th>
<th>Type</th>
<th>$SiO_2$</th>
<th>$Al_2O_3$</th>
<th>$Fe_2O_3$</th>
<th>$CaO$</th>
<th>$Na_2O$</th>
<th>$K_2O$</th>
<th>$MgO$</th>
<th>$TiO_2$</th>
<th>$MnO$</th>
<th>$P_2O_5$</th>
<th>$SO_3$</th>
<th>LOI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kaolin</td>
<td>Bento 1</td>
<td>65.86</td>
<td>10.24</td>
<td>1.61</td>
<td>3.42</td>
<td>1.74</td>
<td>0.07</td>
<td>1.17</td>
<td>0.219</td>
<td>0.107</td>
<td>0.007</td>
<td>0.005</td>
<td>14.62</td>
</tr>
<tr>
<td></td>
<td>Bento 2</td>
<td>65.32</td>
<td>12.02</td>
<td>1.71</td>
<td>1.87</td>
<td>3.62</td>
<td>2.48</td>
<td>0.89</td>
<td>0.291</td>
<td>0.028</td>
<td>0.015</td>
<td>0.255</td>
<td>11.30</td>
</tr>
<tr>
<td></td>
<td>Bento 3</td>
<td>66.21</td>
<td>11.21</td>
<td>0.41</td>
<td>1.57</td>
<td>4.02</td>
<td>0.93</td>
<td>0.54</td>
<td>0.159</td>
<td>0.03</td>
<td>0.006</td>
<td>0.01</td>
<td>14.26</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Product</th>
<th>Type</th>
<th>$SiO_2$</th>
<th>$Al_2O_3$</th>
<th>$Fe_2O_3$</th>
<th>$CaO$</th>
<th>$Na_2O$</th>
<th>$K_2O$</th>
<th>$MgO$</th>
<th>$TiO_2$</th>
<th>$MnO$</th>
<th>$P_2O_5$</th>
<th>$SO_3$</th>
<th>LOI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ball Clay</td>
<td>B1</td>
<td>63.74</td>
<td>21.09</td>
<td>1.8</td>
<td>0.32</td>
<td>0.63</td>
<td>4.92</td>
<td>0.58</td>
<td>0.941</td>
<td>0.004</td>
<td>0.051</td>
<td>0</td>
<td>5.05</td>
</tr>
<tr>
<td></td>
<td>B2</td>
<td>58.89</td>
<td>23.59</td>
<td>1.75</td>
<td>0.1</td>
<td>0.11</td>
<td>0.19</td>
<td>0.52</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.02</td>
<td>6.36</td>
</tr>
<tr>
<td></td>
<td>B3</td>
<td>64.28</td>
<td>23.63</td>
<td>2.06</td>
<td>0.14</td>
<td>0.46</td>
<td>0.46</td>
<td>2.53</td>
<td>1.014</td>
<td>0.267</td>
<td>0.097</td>
<td>0.115</td>
<td>5.9</td>
</tr>
</tbody>
</table>
### Magnesium Oxide

<table>
<thead>
<tr>
<th>Chemical Properties</th>
<th>MgO</th>
<th>CaO</th>
<th>Na₂O</th>
<th>K₂O</th>
<th>SiO₂</th>
<th>Fe₂O₃</th>
<th>Al₂O₃</th>
<th>LOI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage</td>
<td>64.94</td>
<td>1.63</td>
<td>2.14</td>
<td>1.64</td>
<td>2.7</td>
<td>1.57</td>
<td>0.23</td>
<td>25.85</td>
</tr>
</tbody>
</table>

### Carboxymethyl Cellulose

<table>
<thead>
<tr>
<th>Physical Properties</th>
<th>Melting point</th>
<th>Density</th>
<th>Storage Temp.</th>
<th>Solubility</th>
<th>Form</th>
<th>Color</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>274 °C</td>
<td>1.6 g/cm³</td>
<td>Room temp.</td>
<td>H₂O: 20°/ml</td>
<td>Low viscosity</td>
<td>White to light yellow</td>
</tr>
</tbody>
</table>
آجرهای نسوز آلومینا سیلیکاتی (Refractory Aluminosilicate Bricks)

<table>
<thead>
<tr>
<th>Product Type</th>
<th>BA-60</th>
<th>BA-70</th>
<th>BA-80</th>
<th>BA-85</th>
<th>BA-90</th>
</tr>
</thead>
<tbody>
<tr>
<td>( Al_2O_3 ) (%)</td>
<td>60</td>
<td>70</td>
<td>80</td>
<td>85</td>
<td>90</td>
</tr>
<tr>
<td>( SiO_2 ) (%)</td>
<td>35</td>
<td>23</td>
<td>16</td>
<td>12</td>
<td>8</td>
</tr>
<tr>
<td>( TiO ) (%)</td>
<td>2.8</td>
<td>2.3</td>
<td>2.4</td>
<td>1.8</td>
<td>1.5</td>
</tr>
<tr>
<td>( Fe_2O_3 ) (%)</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
<td>1.1</td>
<td>0.5</td>
</tr>
<tr>
<td>Density ( \text{gr/cm}^3 )</td>
<td>2.4-2.6</td>
<td>2.4-2.6</td>
<td>2.5-2.7</td>
<td>2.85-2.95</td>
<td>2.85-3</td>
</tr>
<tr>
<td>Apparent Porosity (%)</td>
<td>17-23</td>
<td>17-23</td>
<td>17-23</td>
<td>16-20</td>
<td>16-20</td>
</tr>
<tr>
<td>1/25 ( \text{kg/m}^3 )</td>
<td>400-600</td>
<td>450-650</td>
<td>450-650</td>
<td>900-1100</td>
<td>900-1100</td>
</tr>
<tr>
<td>Refractoriness °C</td>
<td>1400</td>
<td>1450</td>
<td>1500</td>
<td>1550</td>
<td>1650</td>
</tr>
<tr>
<td>Max Service temp. °C</td>
<td>1500</td>
<td>1550</td>
<td>1570</td>
<td>1600</td>
<td>1700</td>
</tr>
</tbody>
</table>
## Insulation Boards

<table>
<thead>
<tr>
<th>Product</th>
<th>FB-60</th>
<th>FB-70</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Chemical Analysis</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$Al_2O_3$ (%)</td>
<td>$\approx 45$</td>
<td>$\approx 36$</td>
</tr>
<tr>
<td>$SiO_2$ (%)</td>
<td>$\approx 53$</td>
<td>$\approx 48$</td>
</tr>
<tr>
<td>$ZrO_2$ (%)</td>
<td>0.0</td>
<td>$\approx 16$</td>
</tr>
<tr>
<td>$TiO_2$ (%)</td>
<td>$\geq 0.5$</td>
<td>$\geq 1$</td>
</tr>
<tr>
<td>$Fe_2O_3$ (%)</td>
<td>$\geq 0.5$</td>
<td>$\geq 0.5$</td>
</tr>
<tr>
<td>$Na_2O$ (%)</td>
<td>$\geq 0.5$</td>
<td>$\geq 1$</td>
</tr>
<tr>
<td><strong>Physical Properties</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Density $\text{kg/m}^3$</td>
<td>270-350</td>
<td>270-350</td>
</tr>
<tr>
<td>CCS (Mpa)</td>
<td>0.19</td>
<td>0.12</td>
</tr>
<tr>
<td>Refractoriness $^\circ$C</td>
<td>1250</td>
<td>1450</td>
</tr>
<tr>
<td>Max Service Temp. $^\circ$C</td>
<td>1100</td>
<td>1350</td>
</tr>
<tr>
<td>Dimensions</td>
<td>$900 \times 600 \times 25$</td>
<td>$900 \times 600 \times 25$</td>
</tr>
<tr>
<td></td>
<td>$1200 \times 1000 \times 50$</td>
<td>$1200 \times 1000 \times 50$</td>
</tr>
<tr>
<td>Product</td>
<td>Max. Service Temp., °C</td>
<td>Density, kg/m³</td>
</tr>
<tr>
<td>------------------</td>
<td>-------------------------</td>
<td>----------------</td>
</tr>
<tr>
<td>FB 60</td>
<td>123-130</td>
<td>0.0</td>
</tr>
<tr>
<td>FB 70</td>
<td>123-130</td>
<td>0.0</td>
</tr>
<tr>
<td>FB 80</td>
<td>128-135</td>
<td>&gt;0.5</td>
</tr>
<tr>
<td></td>
<td>131-155</td>
<td>&gt;0.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.5</td>
</tr>
</tbody>
</table>
تأمین مواد اولیه مورد نیاز صنایع فولاد، پتروشیمی و سرامیک

تأمین و تولید قطعات سرامیک‌های مهندسی در صنایع نفت، گاز، پالایش و پتروشیمی

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