

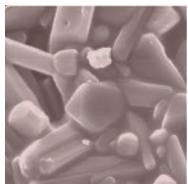
# VIRGINIA MULLITE™ | $3\text{Al}_2\text{O}_3 \cdot 2\text{SiO}_2$

## SPECIFICATION SHEET



### KYANITE MINING CORPORATION

Consistent Purity • Abundant Supply • Personalized Service



## What is Mullite?

Mullite is an important ceramic material and is a key ingredient in many high-temperature products. Mullite has a high melting temperature, high hot strength, and excellent thermal shock and creep resistance. Mullite has no polymorphic inversions, making it volume stable at very high temperatures and has a low coefficient of thermal expansion. It has excellent electrical insulation and hot load-bearing properties and is resistant to many corrosive environments. When mullite re-crystallizes in a ceramic or a refractory it forms as small lenticular crystals which promote high strength, even at very high temperatures.

## Making Virginia Mullite™ by Calcining Virginia Kyanite™

Mullite is rarely found in nature and thus must be formed for commercial use. Virginia Mullite™ is unique as it is created by calcining Virginia Kyanite™, not by calcining clay minerals. Virginia Kyanite™ is converted to Virginia Mullite™ via a phase transition in a rotary kiln, calcined in excess of 1450°C. The resulting product contains 55-60% alumina, about 80% mullite, 11% finely dispersed amorphous silica, 7% quartz, and less than 1% cristobalite. The amorphous silica is highly reactive and combines easily with sources of alumina to form secondary mullite. Virginia Mullite™ has a different particle shape to that of mullite formed by calcining clay minerals. Virginia Mullite™ is very low in magnetic iron and other impurities, which brings added benefits.

## Uses

Virginia Mullite™ is a key ingredient in refractory and ceramics applications due to its exceptional hot properties. Virginia Mullite™ has excellent electrical properties and is used in a wide range of electrical

insulators and in heating elements where electrical receptivity is important. Virginia Mullite™ is used in brake shoe linings as a friction modifier; it is heat resistant and helps provide a clean friction surface as the brake wears down due to its friability and shape. Virginia Mullite™ is used in various foundry washes and coatings for specialty alloy steel castings; it provides excellent surface finish to the casting and can be used with higher temperature alloys. Virginia Mullite™ is extensively used in mullite/cordierite kiln furniture where creep resistance is critical. Virginia Mullite™ is used in investment casting shells as both slurry and stucco materials and is successfully being used in equiax, directional, and single crystal castings.

Typical Chemical Analysis (%)	
$\text{Al}_2\text{O}_3$	57.0 *(55.0 min)
$\text{SiO}_2$	40.2
$\text{TiO}_2$	1.1
$\text{Fe}_2\text{O}_3$	0.5 (0.75 max)
$\text{CaO}$	<0.04
$\text{MgO}$	<0.03
$\text{Na}_2\text{O}$	<0.04
$\text{K}_2\text{O}$	<0.07
$\text{P}_2\text{O}_5$	<0.15
Mineralogy (%)	
Mullite	79-85
Amorphous	8-12
Quartz	4-8
Cristobalite	<1
Specific Gravity	3.00 g/cm³

## Typical Screen Specification of Virginia Mullite Grains

	40m (420 $\mu\text{m}$ )	50m (300 $\mu\text{m}$ )	100m (150 $\mu\text{m}$ )	140m (106 $\mu\text{m}$ )	200m (75 $\mu\text{m}$ )	325 m (45 $\mu\text{m}$ )	Pan
<b>35 Mesh</b>	15-30	15-30	30-45				10-30
<b>48 Mesh</b>		4-10	10-25	10-20	10-20		33-55
<b>100 Mesh</b>			5-10	8-20	12-25		50-73
<b>200 Mesh</b>					10 max		90 min
<b>325 Mesh</b>						10 max	90 min

Screen analysis is reported on US Standard sieves. Pan designates material passing the last reported screen. All analysis are expressed in weight percent.

06/2021