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Minerals Technical Data

PYRAX[®] RG Pyrophyllite

Refractory Grade Pyrophyllite

PYRAX RG is a valuable refractory raw material for use in:

- 1) Foundry washes
- 2) Insulating firebrick
- 3) Metal pouring refractories
- 4) Alumina-silica monolithic refractories:
 - Ramming mixes
 - Gunning mixes
 - Castable mixes
- 5) Kiln car refractories
- 6) Ceramic Filters
- 7) Catalytic converter carriers

General Description:

Description:	High pyrophyllite ore with low alkali content
Crystallinity:	Laminar to semi-massive
Workability:	Nonplastic
Density:	2.8 to 2.9 Mg/m ³
PCE (ASTM C-24):	27 to 28

Typical Chemical Analysis:

(Calculated as oxides)

	%
Silicon dioxide (SiO ₂)	71.5
Aluminum oxide (Al ₂ O ₃)	20.8
Iron Oxide (Fe ₂ O ₃)	1.9
Magnesium oxide (MgO)	0.1
Calcium oxide (CaO)	0.1
Sodium oxide (Na ₂ O)	0.4
Potassium oxide (K ₂ O)	0.3
Titanium dioxide (TiO ₂)	0.5
Ignition loss	4.0

X-ray and Petrographic Analysis:

<u>Mineral</u>	<u>Composition</u>	<u>Amount %</u>
Pyrophyllite	Al ₂ O ₃ • 4SiOH ₂ O	60 to 70
Quartz	SiO ₂	20 to 30
Kaolin	Al ₂ O ₃ • 2SiO ₂ •2H ₂ O	3 to 7
Muscovite	K ₂ O • 3Al ₂ O ₃ •6SiO ₂ • 2H ₂ O	1 to 5

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Typical Screen Analysis and Bulk Densities of **PYRAX® RG** Pyrophyllite

<u>Screen Numbers</u>		<u>Cumulative Percent Retained</u>	
<u>U.S. Series</u>	<u>µm</u>	<u>140 Mesh</u>	<u>200 Mesh</u>
100	150	1.0	Trace
200	75	14.0	1.0
325	45	21.5	4.6
 <u>Compact Bulk</u>			
lbs/ft ³		61	59
kg/m ³		977	945

Properties:

PYRAX RG has the following properties of particular interest for refractory applications:

- 1) Permanent expansion
- 2) Excellent reheat stability
- 3) Low hot load deformation
- 4) Low reversible thermal expansion
- 5) Low bulk density
- 6) Low thermal conductivity
- 7) High resistance to corrosion by molten metals and basic slags

The *permanent expansion* of **PYRAX RG** is due to physical changes taking place during dehydration. The greatest expansion occurs between 650°C (1200°F) and 870°C (1600°F) which corresponds approximately to the range of greatest weight loss. The amount of expansion is dependent on the particle size.

The *reversible thermal expansion* of **PYRAX RG** is low for specimens fired below C/13 (1330°C, 2430°F). This property is dependent on the heat level, for at higher temperatures the silica is gradually converted to cristobalite and there is a corresponding increase in expansion.

The excellent *dimensional stability* of **PYRAX RG** is well-established.

Pyrophyllite compositions show *superior hot load bearing ability*, as was demonstrated by W. Gower and W. C. Bell.

There is high *resistance to thermal shock* (spalling) by virtue of pyrophyllite's *low thermal conductivity* and *low coefficient of thermal expansion*.

Above 1050°C the *transformation of pyrophyllite to mullite* corresponds to significant increases in mechanical properties, such as compressive strength, flexural strength and hardness.

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