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## SUITABILITY OF A KAOLIN FOR FIREBRICKS

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### SUMMARY

An almost pure kaolin, highly coloured with organic matter, obtained from South Mount Cameron, has been tested for suitability for the manufacture of firebricks. Semi-dry pressing was considered to be the best process for use with this material, and gave satisfactory results when two parts of grog were incorporated with one part of kaolin; the grog being manufactured from the same material by firing pressed briquettes, and crushing to suitable size.

Briquettes fired to 1300°C appear to be of excellent quality for firebricks, but further tests would be necessary before complete assessment of this material is possible.

### PREPARATION AND TESTING

The dried clay was pulverised to a powdery texture, and briquettes pressed with 10% moisture. After firing for two hours at 1200°C, these briquettes were jaw and roll crushed to pass a 12 mesh B.S. screen. A blend of two parts of this grog with one part of fresh clay was then pressed into briquettes with 10% moisture, and fired for two hours at 1300°C. Blends containing from 50% grog to 80% grog were also tried.

Further tests were carried out on the original clay—refractoriness, brightness, chemical analysis and grit analysis.

## RESULTS

*Grog Sizing* (on B.S. screens)

Plus 18 mesh	Plus 25 mesh	Plus 36 mesh	Plus 60 mesh	Plus 100 mesh
31½%	51%	66½%	81%	89½%

*Pressing* (with 10% moisture)

- 50% grog—Pressed fairly well; slightly pinched.
- 60% grog—Satisfactory.
- 66½% grog—Satisfactory.
- 70% grog—Pressed well; rather weak.
- 80% grog—Not well formed; very weak.

*Drying Contractions*

Briquettes did not contract on drying.

*Firing Contractions and Fired Strength* (firing to 1300°C)

- 50% grog—5½% very strong.
- 60% grog—4½% very strong.
- 66½% grog—4½% strong.
- 70% grog—3½% fairly strong.
- 80% grog—3% weak.

*Refractoriness*

No sign of fusion at 1500°C.

*Brightness and Grit*

From brightness 55 on the original clay, semi-dry pressed specimens increased on firing to brightness 85.

Grit analysis 1.2%.

*Chemical Analysis*

- SiO<sub>2</sub>—47.7%
- R<sub>2</sub>O<sub>3</sub>—38.8%
- CaO—Trace
- MgO—Trace
- Na<sub>2</sub>O + K<sub>2</sub>O—Trace
- Ignition Loss—13.8%.

*Further Tests as a Refractory*

The following tests are recommended for this material:—

1. Refractoriness above 1500°C.
2. Refractoriness under load at high temperatures.
3. Spalling with changes in temperature.