

TR11-194-196

**R. 531****35, 36. PAINTER, MAMO AND ASSOCIATES: BRICK  
MANUFACTURING TESTS****Introduction**

Mr V. Threader, Geologist, submitted four samples on account of the Director of Mines, who has had the clay deposits investigated for Painter, Mamo and Associates of Launceston.

**Samples**

Samples were submitted for brick manufacturing tests by stiff plastic pressing:—

1. Sandy clay from granite Scottsdale-Bridport Road (3515).
2. Sandy clay from granite Scottsdale (3516).
3. Warrentinna area (3517).
4. Warrentinna area (3518)

Tests on individual samples were requested, together with blends of 1 and 2, 3 and 4, and 1, 2, 3 and 4.

**Summary**

Of the four samples submitted, only Sample 4 could be recommended for use as a brick making material, and even this cannot be used singly but must be blended with other material to yield a satisfactory product. In addition Sample 4 is intrinsically unsuitable for stiff-plastic pressing unless blended with other material.

The remaining three samples showed significant disadvantages which preclude their use as basic brick making materials, although Samples 1 and 3 may have applications as blending material.

**Preparation and Testing**

All samples were dried and crushed to pass a 10 mesh sieve. Water was then added with hand mixing, followed by a single pass through a Rawdon pug mill. Samples 1 and 2 were rheologically suitable for stiff-plastic pressing, but Samples 3 and 4 could not be processed in this manner. Blends of 1 and 2 and of all four samples were also suitable for stiff-plastic pressing, but the Samples 3 and 4 and the blend of 3 and 4 could only be processed by hand pressing.

All bricks were air dried for 24 hours, followed by oven drying at 110° C for a similar period. The bricks were then fired at various temperatures with two hour soakings, cooled and examined.

T.C. = total contraction. F.L. = firing loss.

Test Results

Mix	Dry Green State	FIRED				
		950°C	1000°C	1050°C	1100°C	1200°C
Sample 1: 15% water added to ground material.	Water lost on drying 14.3% Contraction 2%	..	T.C. 2% F.L. 3.5% No bonding	T.C. 2% F.L. 3.5% No bonding	T.C. 2% F.L. 3.6% No bonding	T.C. 4% F.L. 4.8% No bonding
Sample 2: 18% water added to ground material.	Water lost on drying 16% Contraction 3%	..	T.C. 3% F.L. 5.9% No bonding	T.C. 3% F.L. 5.9% No bonding	T.C. 3% F.L. 5.9% No bonding	T.C. 8% F.L. 7% No bonding
Sample 3: 16% water added to ground material.	Water lost on drying 15.5% Contraction 1%	..	T.C. 1% F.L. 4% No bonding	T.C. 3% F.L. 4.1% Bonded	..	..
Sample 4: 20% water added to ground material.	Water lost on drying 17.6% Contraction 1%	T.C. 2% F.L. 4.7% Bonded	T.C. 4% F.L. 4.8% Bonded	..	..	..
Blend 1 and 2: 15% water added to ground material.	Water lost on drying 14.2% Contraction 2%	..	T.C. 2% F.L. 5% No bonding	T.C. 3% F.L. 5% No bonding	T.C. 3% F.L. 5% No bonding	T.C. 6% F.L. 5.8% No bonding
Blend 3 and 4: 15% water added to ground material.	Water lost on drying 14.3% Contraction 1%	T.C. 2% F.L. 4% No bonding	T.C. 2% F.L. 4.1% Bonded	..	..	..
Blend 1, 2, 3 and 4: 15% water added to ground material.	Water lost on drying 14% Contraction 2%	..	T.C. 2% F.L. 4.7% No bonding	T.C. 3% F.L. 4.8% Bonded	..	..

## Conclusions

### Sample 1

No evidence of any bonding material present, as fired samples have no mechanical strength when fired at temperatures ranging from 1000° C to 1200° C. The bricks themselves after heating at 1200° C show no signs of distortion, bloating or cracking, which indicates the material could be used as an opening material for a fat clay, or conversely to limit distortion in a clay containing an excess of fluxes. Samples fire to a cream white colour.

### Sample 2

This material also shows no signs of bonding at temperatures up to 1200° C, and in addition shows heavy surface cracking and bloating.

### Sample 3

From the test results this material bonds at 1050° C, but not at 1000° C. As the temperature differential in many existing kilns can vary considerably there would be a strong risk of underfiring. Bricks fired at 1050° C have a smooth finish, and are rust red coloured.

### Sample 4

Bricks made from Sample 4 are a light rust red colour with a smooth surface. They show a strong tendency towards distortion, which increases with temperature. The material would be well used blended with a firmer material such as Sample 1. Correct blending proportion could be determined if required.

### Blend Sample 1 and 2

This blend gave a product of little or no mechanical strength, which was to be expected from the individual performance of the two materials. It is worth mentioning that the blend showed no tendency to bloat or crack at temperatures up to 1200° C which confirms the value of Sample 1 material.

### Blend Sample 3 and 4

Bricks made of these two materials bonded at 1000° C, but showed sufficient distortion to preclude the use of this combination.

### Blend Sample 1, 2, 3 and 4

With this mixture bonding occurred at 1050° C, but was absent at 1000° C. This presents the same problem as stated for Sample 3. Additionally, the introduction of Sample 2 into the mix seems pointless on its individual performance.