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R. 555

**LUCK'S BRICK WORKS—DULVERTON****Introduction**

Three samples of material in current use at Luck's Brick Works were supplied for investigation. Problems being encountered using these materials were poor extrusion, white scum, vanadium staining and the insipid colour of the final product.

**Samples**

- (a) Lean material from the Bush pit.
- (b) Lean material of 50/50 (a) and material from Works pit (current mixture).
- (c) Sand.

**Testing**

The following mixtures were processed through a Rawdon pug mill, then de-aired and extruded. Bricks produced were dried and fired at 1000° C and 1100° C.

- (1) Lean material from Bush pit.
- (2) Lean material from Bush pit plus 1% calcium fluoride.
- (3) Current mixture.
- (4) Current mixture plus 1% calcium fluoride.
- (5) Current mixture plus 10% sand.
- (6) Current mixture plus 10% sand plus 1% calcium fluoride.

**Results**

All mixtures were prone to slight dog-earing on extrusion, but with a water content of about 20% this defect was remedied. The bricks of all mixtures fired at 1000° C were pale pink, whereas bricks fired at 1100° C gave a deep red coloured product.

The formation of a white scum was evident on the fired products of (4) and (6) irrespective of the temperature of firing. It is worth noting that white scum did not occur with mixture (2) and the fired products from this mixture showed very little vanadium staining. The addition of sand had little, if any, effect on the final product.

### Conclusions

There has been no previous work done by this department on the addition of calcium fluoride to the red brick clay in use at this brick works. Investigations now completed show that with clay containing a high sulphate content the vanadium staining can be reduced only at the expense of white scum formation. It is therefore recommended that calcium fluoride addition should only be used where the sulphate content of the clay is known to be of a very low order. Evidence from bricks made in this department and fired in Luck's oil burning kiln, with oil containing a high percentage of sulphur, show white staining can occur due to sulphate pick-up from the combustion of this fuel oil.

Firing of the final product at a temperature of  $1100^{\circ}\text{C}$  in an oxidising atmosphere is recommended to improve the colour of the brick. This will help to reduce vanadium staining to some extent, and a further reduction in this staining will also be obtained by eliminating Works pit material from the mix.

Difficulties with extrusion can be overcome by using a higher water content in the mix, but if this is not feasible, the addition of 1% sodium carbonate (as a solution) will facilitate a smoother column. There will, however, be efflorescence problems with sodium carbonate when using clay containing a high percentage of sulphate.

