TRT-199-201 R. 407

CLAY AND SHALE, HOBART BRICK COMPANY.

Description

Four samples of clay and one sample of shale received from the Hobart Brick Co. on 12th March, 1962, have been blended in the proportions requested and tested for brick production by de-aired extrusion at a vacuum of 28 inches of mercury.

Blends containing "Own Cream Clay", "Top Clay" and "Own Shale" were successfully extruded, dried and fired at the range of temperatures shown, the only defect being in those blends containing a high percentage of shale. In these blends the extruded column was somewhat notched and cut badly, due to unsoftened particles of shale. This defect is virtually eliminated by crushing the shale to minus 22 mesh.

"Champion Light Clay" extruded with a very weak column with high drying and firing contractions. The fired briquette showed a minor amount of cracking.

"Champion Dark Clay" and the blend of Champion Light and Dark, would not extrude successfully. The column was of weak strength and badly dog-eared. The dried briquettes showed hair line cracks which became more severe on firing.

Description

Blend A	"Own Cream" Clay plus 10 per cent "Top" Clay.
Blend B	"Own Cream" Clay plus 20 per cent "Top" Clay.
Blend D	"Own Cream" Clay plus 5 per cent "Own" Shale.
Blend E	"Own Cream" Clay plus 15 per cent "Own" Shale.
Blend F	"Own" Shale plus 10 per cent "Top" Clay.
Blend FX ..	"Own" Shale (Recrushed to minus 22 mesh) plus 10 per cent "Top" Clay.
Blend G	"Own" Shale plus 20 per cent "Top" Clay.
Blend H	"Champion" Light Clay.
Blend I	"Champion" Dark Clay.
Blend J	Equal parts of "Champion" Light and Dark Clay.

Preparation and Testing

The samples were dried when necessary and roll crushed to pass an $\frac{1}{8}$ inch screen. In the case of Blend FX, the shale was recrushed to minus 22 mesh to see if better extrusion and cutting were obtainable with finer material. All blends were thoroughly mixed in the dry state then thoroughly pugged with the required water. Extrusion was at 28 inches of mercury vacuum. The briquettes were dried naturally and fired at the range of temperatures shown, soaking for 2 hours.

Results

Refractoriness and Ignition Loss

	Per Cent Moisture	Refractoriness	Per Cent Ignition Loss
Own Cream Clay	2.8	Unfused at 1420°C	5.8
Top Clay	2.8	Unfused at 1420°C	7.4
Own Shale	1.9	Fused at 1300°C	4.2
Champion Light Clay	6.7	Started softening at 1420°C	7.6
Champion Dark Clay	5.5	Fused at 1300°C	6.8

De-Aired Brick Extrusion

	% Extrusion Moisture	% Drying Contraction	Percent Firing Contraction 950°	1000°	1050°	1100°	% Loss of Weight on Firing
Blend A	21.6	6	1	1.5	3	5	6.0
Blend B	22.0	6	Nil	1	3.5	5	6.0
Blend D	21.2	5	0.5	1	2.5	4.5	6.1
Blend E	21.1	5	0.5	2	3.5	4.5	5.9
Blend F	14.8	2.5	1.0	1.5	3.5	4.5	5.5
Blend FX	16.8	4	1.0	1.5	5	5	4.5
Blend G	15.6	3.5	0.5	1.5	3.5	4.5	4.7
Blend H	27.5	10	2	3	8	10	6.7
Blend I	24.0	5	2	2	4	6	5.9
Blend J	26.0	8	Nil	1	4.5	7	5.5

Blends A, B, D and E extrude well, dry and fire without cracking.

Blends F and G extrude with somewhat notched corners and cut roughly due to unsoftened particles of shale. By crushing the shale to minus 22 mesh as in blend FX, the notching is almost eliminated and cutting is very good. Bricks dry and fire without cracking. Blend H extrudes fairly well, but clay column is not very plastic and shows some tendency to crack transversely from slightly notched edges. Dry and fire with a minor amount of cracking.

Blends I and J extrude badly with very weak green strength column with bad dog-earing. Dried with hair line cracks which extend on firing. Sample is unsuitable for extrusion.

All bricks have a good sound ring and with the exception of Blends I and J, withstood rapid drying at 105°C without cracking. All bricks seem well fired at 950°C.

	Fired Colour 950°C, 1000°C	1050°C	1100°C
Blend A	Light Buff	Light Buff	Light Buff
Blend B	Light Buff	Light Buff	Pinkish Buff
Blend D	Light Buff	Light Buff	Pinkish Buff
Blend E	Light Buff	Light Buff	Pinkish Buff
Blend F	Light Brown	Chocolate	Chocolate
Blend FX	Light Brown	Chocolate	Chocolate
Blend G	Light Brown	Chocolate	Chocolate
Blend H	Ochre	Red	Dark Red
Blend I	Ochre	Red	Dark Red
Blend J	Ochre	Red	Dark Red