

## TR 7-202-203 R. 415: Part 1

## D1—CLAY FROM DOVER

## Summary

A sample of plastic clay received from McHugh Brothers and stated to be from Dover has been examined for suitability for brick and pipe manufacture by de-aired extrusion.

The material is unsuitable for pipe extrusion. All pipes extruded and fired at 1000°-1200°C. would not withstand a pressure of 20 lbs. per square inch, but leaked badly. Extruded bricks may be rapidly dried at 105°C without cracking and fire to a sound brick which shows some signs of cracking at 1100°C to 1200°C, but no cracking below 1100°C. Vanadium efflorescence is very high in the bricks and if the material was to be used for brick manufacture, some form of treatment using additives or sealing of the brick surface would be necessary to reduce the disability of the vanadium content.

## Preparation and Testing

The sample of clay was roll crushed to minus  $\frac{1}{8}$  inch and thoroughly pugged after the addition of the necessary water. Extrusion was de-aired at a vacuum of 28 inches of mercury. After natural drying the test pieces were fired at the range of temperature shown and soaked for two hours.

## Results

## Sizing Analysis

	Per Cent Weight
+200 mesh .....	9.9
-200 mesh .....	90.1
Composite .....	100.0

The +200 mesh fraction was essentially clean quartz.

## Extrusion

	% Tempering Water	Power KWH/1000g	Drying Contraction % 105°C	Percent Firing Contraction					Firing Loss of Weight %
				1000°	1050°	1100°	1150°	1200°	
D1 pipe .....	38.8	.....	6.25	2.25	2.75	3.75	7.0	7.5	.....
D1 brick .....	40.1	.0174	8.25	1.75	2.75	3.75	6.75	6.75	8.8

Modulus of rupture on bricks (lbs. per square inch).

	Dried at 105°C	Fired at 1050°C
D1 .....	270-300	470-570

Power results represent the kilowatt hours of power needed to extrude 1000 grams of clay 1.25 x 1.5 inch cross section.

Modulus of rupture results are calculated for a bar of clay 1.25 x 1.5 inch section supported on knife edges 2.75 inches apart.

Bricks and pipes may be rapidly dried without cracking and fire well without cracking to 1100°C. Some signs of cracking are apparent from 1100°-1200°C. The colour of the fired brick is light buff.

All pipes leak water at 20 lbs. per square inch pressure.

The bricks show extensive efflorescence due to vanadium salts, the extent of the efflorescence increasing with higher firing temperature.