

TABLE 3—(Continued)

| | ZAPATA COUNTY | | | ZAVALA COUNTY | | |
|--|-------------------|-------------------|------------|---------------|-------------|------------|
| Min. Tech. Lab. No. | 60178 | 60179 | 60180 | 60134 | 60244 | 60245 |
| Field locality No. ^a | 1 | 2 | 3 | 1 | 21 | 22 |
| Free lime (carbonates) | Slightly positive | Slightly positive | Negative | Negative | Negative | Negative |
| | Blue | Blue | Blue | Pale blue | Light blue | Light blue |
| Benzidine test | | | | | | |
| Color (air-dried) | Dark buff | Light buff | Light buff | Light gray | Light tan | Light buff |
| Oil absorption— | | | | | | |
| Calcine 450°C | ---- | ---- | ---- | ---- | 29 | ---- |
| Air-dried | Medium | 45 | 27 | Slow | 29 | 40 |
| Moisture (H ₂ O-) (%) | 9.32 | 4.78 | 8.07 | 0.51 | 4.39 | 4.12 |
| Ignition loss— | | | | | | |
| 300–600°C (%) | 2.62 | 1.96 | 2.96 | 2.95 | 5.14 | 2.44 |
| 105–1050°C (%) | 4.58 | 5.27 | 8.12 | 3.95 | 6.77 | 3.79 |
| Water of plasticity | | | | | | |
| (Atterberg test)— | | | | | | |
| Average (%) | 127 | 57 | 83 | 31 | 74 | 49 |
| Difference (%) | 121 | 43 | 72 | 12 | 66 | 32 |
| Swelling test (percent increase in volume)— | | | | | | |
| In distilled water | 487 | 317 | 322 | 13 | 256 | 32 |
| In salt water | 52 | 26 | 50 | 43 | 63 | 14 |
| Slaking test (–100 mesh) (%) | 25 | 28 | 81 | <2 | 87 | <10 |
| Bloating test: 10 minutes at— | | | | | | |
| 2000°F | ---- | ---- | ---- | ---- | ---- | ---- |
| 2200°F | Negative | Negative | Negative | ---- | ---- | ---- |
| 2400°F | ---- | ---- | ---- | ---- | ---- | ---- |
| Yield of 15 cp. drilling mud (bbl. per ton)— | | | | | | |
| Untreated | Low | ---- | Very low | ---- | 26 | ---- |
| Treated with soda ash | 49 | 49 | 50 | ---- | 28 | ---- |
| pH value | 10.0 | 8.7 | 8.2 | 8.1 | 8.3 | 8.8 |
| Decolorizing efficiency compared to AOCS official clays— | | | | | | |
| Natural with natural (%) | Very low | ---- | Very low | ---- | ---- | ---- |
| Activated with activated (%) | 62 | ---- | 49 | ---- | ---- | ---- |
| Firing test— | | | | | | |
| Powder—2000°F (1093°C) | Dark brown | Gray | Black | Cream | Buff powder | Tan |
| | | | | | Cream | Sintered |
| 2200°F (1204°C) | Fused | Steel hard | Steel hard | Sintered | Sintered | Gray |
| | | | | | Friable | Steel hard |
| 2400°F (1316°C) | ---- | Gray | Black | Light cream | Dark cream | Gray |
| | | Fused | Fused | Steel hard | <Steel hard | Vitrified |
| 2600°F (1427°C) | ---- | ---- | ---- | Light cream | Gray | ---- |
| | | | | Vitrified | Vitrified | |
| Disks, ½-inch diameter— | | | | | | |
| (Approx. cone 02) 2000°F | ---- | ---- | ---- | ---- | ---- | ---- |
| (1093°C) | | | | | | |
| (Approx. cone 7) 2200°F | ---- | ---- | ---- | ---- | ---- | ---- |
| (1204°C) | | | | | | |
| (Approx. cone 15) 2600°F | ---- | ---- | ---- | ---- | ---- | ---- |
| (1427°C) | | | | | | |
| Loss on ignition at— | | | | | | |
| 105–300°C | 1.36 | 1.01 | 2.01 | 0.49 | 0.87 | 0.89 |
| 300–450°C | 0.76 | 0.50 | 1.42 | 0.95 | 4.39 | 1.80 |
| 450–600°C | 1.57 | 1.46 | 1.54 | 2.00 | 0.75 | 0.64 |
| 600–900°C | 0.35 | 0.54 | 1.24 | 0.39 | } 0.76 | } 0.46 |
| 900–1050°C | 0.22 | 1.76 | 1.91 | 0.12 | | |
| Neutralization value as CaCO ₃ | ---- | ---- | ---- | ---- | ---- | ---- |

Remarks^b (samples arranged by Min. Tech. Lab. numbers)—

No. 60178 A bentonite capable of yielding 49 barrels of 15-cp drilling mud per ton of clay treated with sodium carbonate. It might be possible to increase this yield by varying the chemical treatment. FTR. The oil decolorizing capacity of this clay after acid-activation is 62% compared with the AOCS official activated earth.

No. 60179 A bentonite capable of yielding 49 barrels of 15-cp drilling mud per ton of clay treated with sodium carbonate. FTR. Low oil absorbing capacity (45%).

No. 60180 This bentonite develops a medium oil decolorizing capacity when acid-activated (49%) compared with the official activated clay of the AOCS). Yields 50 barrels of 15-cp drilling mud per ton of clay treated with sodium carbonate. FTR.

No. 60134 NIU as a clay. Predominantly non-clay. Consists of quartz 90%, clay 10%, and traces of glass.

No. 60244 Very low yield of drilling mud even after treatment with sodium carbonate. Low oil decolorizing capacity even after acid-activation. Low oil absorbing capacity.

No. 60245 Low oil absorbing capacity. High non-clay content. No carbonates detected. Should be further tested as an abrasive. Quartz 50%, clay 50%, with albite, muscovite, zircon, and trace of glass.

^a See Plate 2 for location.

^b The following abbreviations are used:

AOCS—American Oil Chemists' Society.

FTR—Further testing by a specialized laboratory is recommended.

NIU—No important industrial (or commercial) use.

NV—Neutralization value expressed as calcium carbonate.

ECB—With the possible exception of common brick. Clays containing as high as 20% carbonates have been included in this classification because there are several plants in operation in Texas producing brick from such clays. Normally it is not desirable to use clays containing more than 3% carbonates (U.S. Bureau of Mines Bulletin 565). The presence of excessive carbonates (lime and magnesia) causes undue shrinkage and shortening of the firing range. Closely regulated firing is required to overcome the latter.

15-CP—15-centipoise.