

Memorandum M-1893

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Digital Computer Laboratory
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SUBJECT: HYSTERESIS TEST RESULTS FROM FIVE NEW GLENCO FERROELECTRIC MATERIALS

To: David R. Brown
From: Channing D. Morrison
Date: March 10, 1953

Abstract: Five new Glenco ferroelectric ceramic materials have a maximum squareness ratio ranging from + 0.61 to + 0.55. These materials are the best that have been tested to date.

The new materials were made by the Glenco Corp. of Metuchen, New Jersey. They are made basically of barium titanate, but have certain unknown additives. An effort will be made to find out from Glenco the exact composition. These five Glenco bodies are numbered: P-36, P-38, P-46, P-48, and P-56.

A test of squareness ratio versus temperature was made on each material. The test results on body P-36 are typical of the materials tested:

| <u>Temp ° C</u> | <u>R_{smax}</u> | <u>Voltage RMS across .015 in.</u> | <u>Volts^{-peak}/mil</u> |
|-----------------|-------------------------|--|----------------------------------|
| 90 | + .50 | 40 | 3.78 |
| 70 | + .60 | 70 | 6.60 |
| 60 | + .61 | 80 | 7.55 |
| 50 | + .60 | 100 | 9.45 |
| 40 | + .60 | 110 | 10.38 |

These results on P-36 are essentially the same as those for the other four materials, and show that the squareness ratio remains essentially constant with changes in temperature from 70° C to 40° C. They also show that the applied voltage needed for the R_{smax} rises with a decrease in temperature.

No quantitative data was taken on the time variation of these hysteresis loops, but it was noted that they seem somewhat more stable than those previously observed.

APPROVED FOR PUBLIC RELEASE. CASE 06-1104.

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These materials show a marked improvement over any Glenco bodies previously tested. The results of this preliminary test will be sent to Glenco, and additional samples of these same bodies will be ordered to see if the electrical properties are reproducible.

Signed Channing D. Morrison
Channing D. Morrison

Approved Dudley A. Buck
Dudley A. Buck

DRB
David R. Brown

CDM/jk

cc: Group 63