

Division 6 - Lincoln Laboratory
 Massachusetts Institute of Technology
 Cambridge 39, Massachusetts

SUBJECT: EVALUATION OF FERROXCUBE CORES

To: D. R. Brown

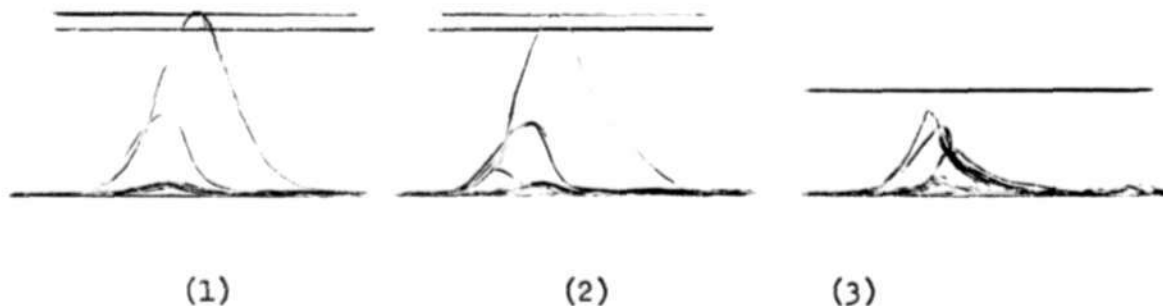
From: P. A. Fergus

Date: June 28, 1954

Abstract: A 1000-core lot, Ferroxcube 170T025A402, was evaluated to determine its usefulness as a memory core. The squareness and signal ratios of this lot were excellent. Its uniformity was good. The switching time of this lot, however, was longer than the switching time of General Ceramics' cores. These cores became disturb sensitive at about 900 ma and appeared to be extremely sensitive to temperature changes. They might be satisfactory (i.e. not disturb sensitive) at lower operating currents, but the longer switching time and the temperature sensitivity rule them out for our application.

Ferroxcube 170T025A402, 1000-core Lot

Uniformity tests indicated this lot seemed to split into three distinct categories--one being the normal good grouping with rV_1 output at 820 ma falling between 120 and 130 mv. Seventy percent of the cores fell in this category. The second category, although responding with the same millivolt output range, fell into a badly disturb-sensitive state. The third category were cores which were disturb sensitive and severely overdriven.



Results of semiautomatic test at 820 ma were as follows:

- (1) 620 cores - 120-130 mv
- (2) 130 cores - badly disturb sensitive
- (3) 17 cores - badly disturb sensitive and overdriven
 - 44 cores - above 130 mv
 - 87 cores - below 120 mv

The squareness ratio of this lot was 0.82 at a driving current of 0.8 ampere-turns. Average value of a 50-core sample gave an r_1^V of 122 mv at 820 ma. Switching time at 820 ma was 1.2 μ sec compared with 0.95 μ sec for General Ceramics' cores.

The cores appeared to be very temperature sensitive. A slight increase in temperature reduced the current at which the cores became disturb sensitive.

<u>Ferroxcube 170T025A402</u>		<u>General Ceramics' Core</u> (Lot L-72)	
Temp.	D.S. Current	Temp.	D.S. Current
27 C	890 ma	28.5 C	980 ma
30 C	850 ma	35 C	960 ma
35 C	830 ma	40 C	950 ma
40 C	820 ma		

Ferroxcube 170T023A402, 5 Marked Cores

Ferroxcube 170T023A402, a lot of 5 cores, had a switching time of 1.05 microsecond at 820 ma. This lot also showed disturb sensitivity at approximately 900 ma. These cores were tested individually on the semiautomatic tester with the following results:

<u>Core</u>	<u>r_1^V</u>
Red	120 mv
Yellow	132 mv
Green	126 mv
Blue	133 mv
White	122 mv

Ferroxcube 170T025A403, 22-core Sample

Ferroxcube 170T025A403, a lot of 22 cores, had excellent signal ratios for memory application. These cores might be useful for switching circuits, but do not have as low a coercive force or switching coefficient as MF-1312. Results of tests on this lot are indicated below.

Squareness ratio - 0.84 at 240 ma

Switching coefficient - 0.72 Oe- μ sec

Coercive force - 0.9 Oe

Switching time \sim 6 μ sec at optimum current of \sim 250 ma.

APPROVED FOR PUBLIC RELEASE. CASE 06-1104.

Memorandum M-2880

Page 3

Due to the similarity of the lot numbers and changes made on the packing slips, there was some difficulty in identifying the lots. They have, however, been recorded according to the present numbers on the packing slips.

Signed Patricia A. Fergus
Patricia A. Fergus

Approved DRB
David R. Brown

PAF/jk

cc: Group 63 Staff
Group 62 Memory Section
IBM (via A. P. Kromer)
N. H. Taylor
W. Wittenberg
W. Strohm
C. Lynch
H. Ross