

CONCLUSION

Many factors govern the designing of the variable iron-core inductor. The flux density is low at a certain frequency, and the winding resistance is also low in order to obtain small losses.

Changing the air gap of the variable inductor has the following advantages:-

- (a) low-loss condition can be achieved,
- (b) the mechanism for changing the air gap can easily be constructed.

The results obtained from testing the constructed variable inductor are quite satisfactory although they are slightly different from the expected results.

1. The actual exciting current appears to be larger than that of the expected value due to the effects of stacking procedure, inter-sheet eddy-currents, grain alignment and particularly the small air gaps between the surfaces of the core when it is in the no-gap position. When the gap lengths are increased, the actual exciting current is smaller due to the leakage flux. The calculation of flux for long gaps and of leakage flux must be approached from the point of view of the field rather than the circuit.

2. The apparent inductance, Fig. 9, slightly differs from the expected value, Fig. 5. The leakage flux makes the value of the inductance higher.

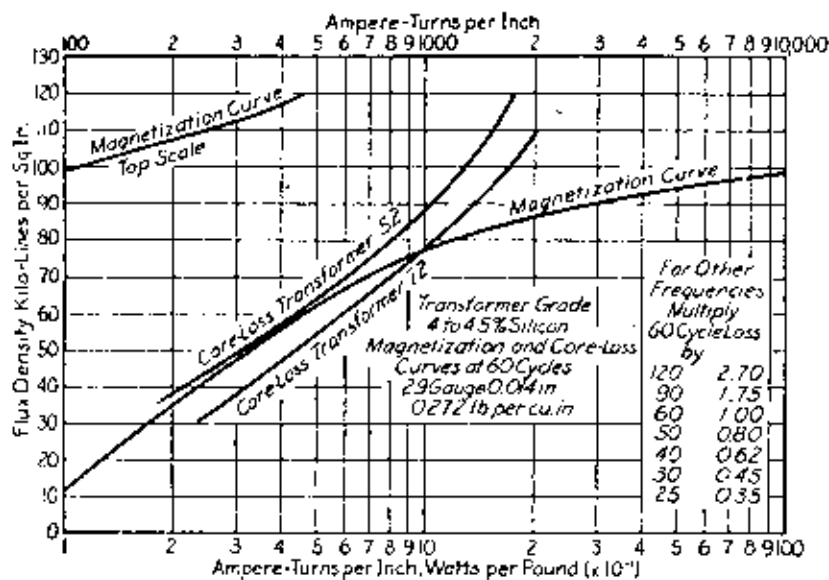
3. The noise from the vibrating laminations can not be avoided when air gaps are present. It was little excessive and has been reduced by clamping the laminations of the core tightly, making

the mechanism to be in good condition. The vibration was absorbed by the soft-wood supporting the inductor.

4. The differences of the exciting currents affect the apparent resistance, reactance, inductance, quality factor and loss ratio.

The variable inductor will be useful for studying of the magnetic circuit. It can also be used as a variable inductive load which is suitable for use in the laboratory.

APPENDIX A

STANDARD MAGNETIZATION AND CORE-LOSS CURVES ²

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