

Figure 19 EDGE ILLUMINATION TEST SAMPLE

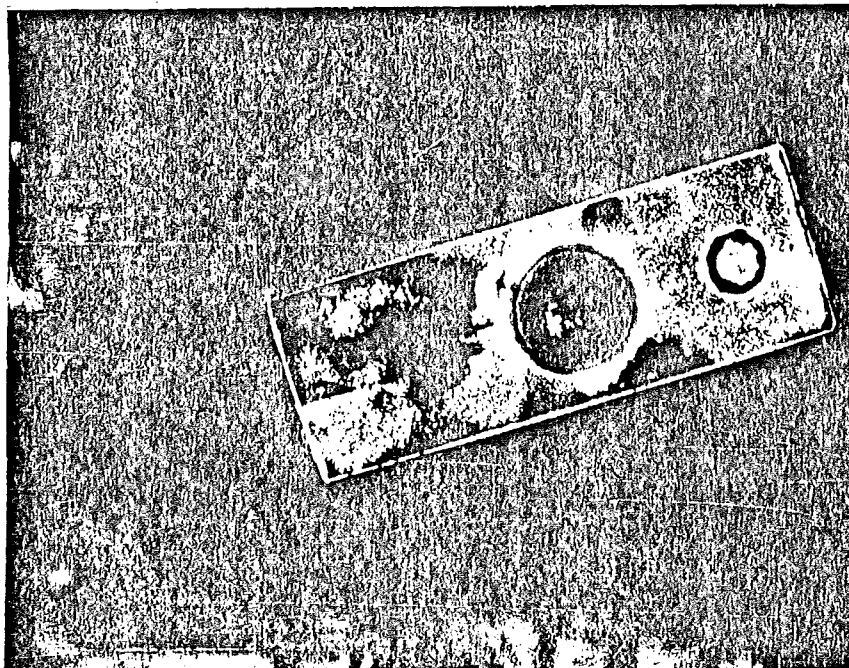
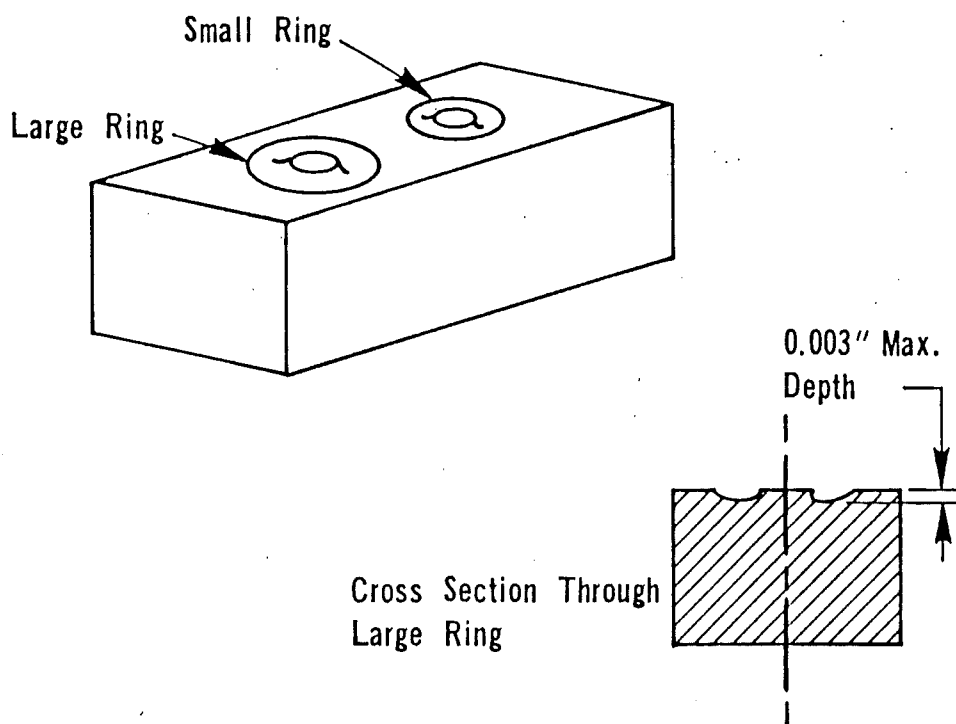
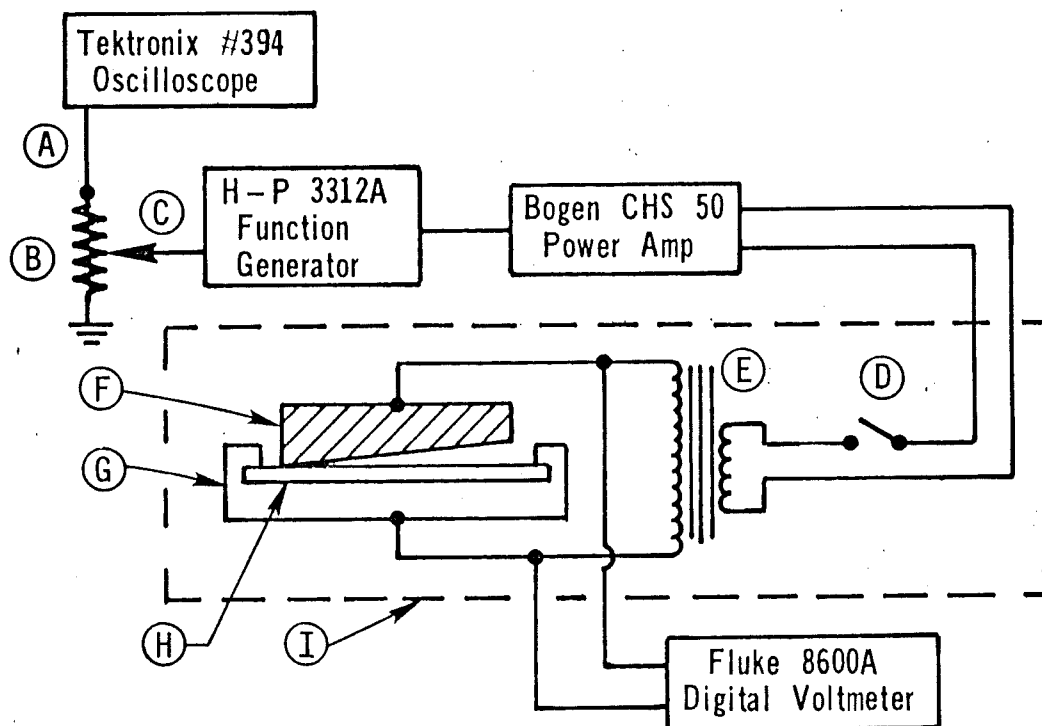
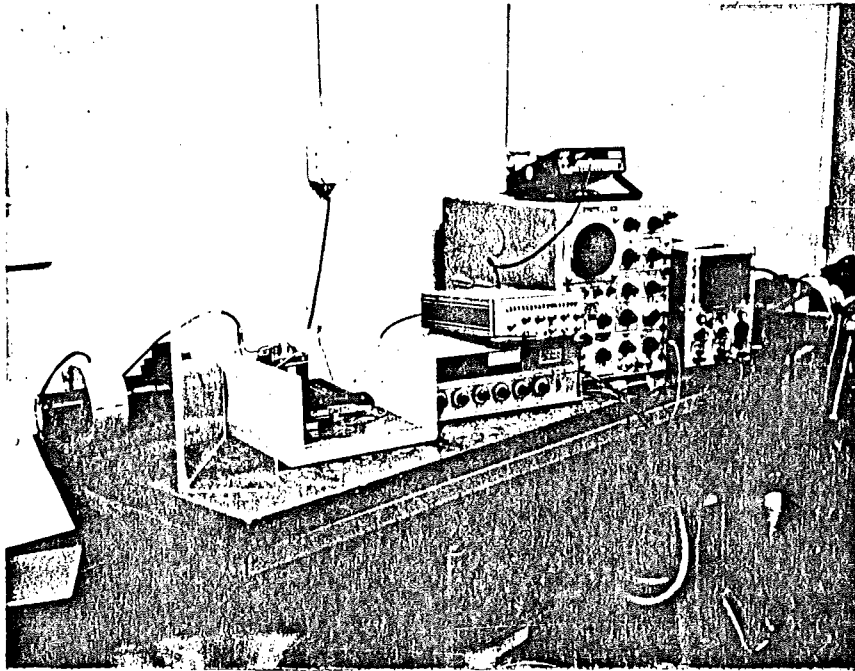


Figure 20
FINAL DIRECT CONTACT APPARATUS

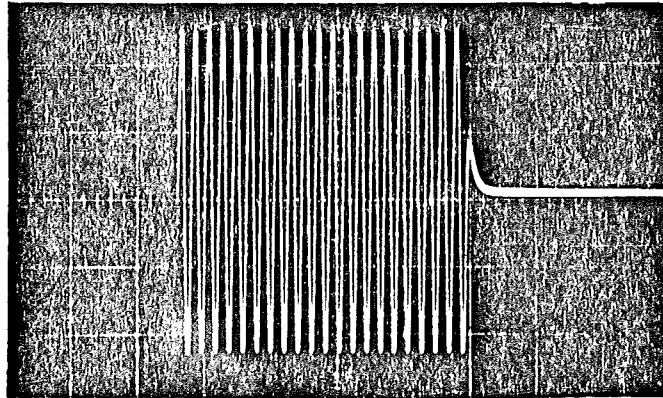


- A--gate out line from Tektronix scope sweep circuitry
- B-Voltage divider
- C-External trigger input of H-P function generator
- D-Interlock switch (permanently closed - see text)
- E-Altec-Lansing audio output transformer
- F-Tapered groove test sample (cutaway to show variable air gap width in groove), w/ high voltage line attached
- G-Polaroid #545 land film holder
- H-Polaroid sype 57 film, in holder
- I-Plastic safety box

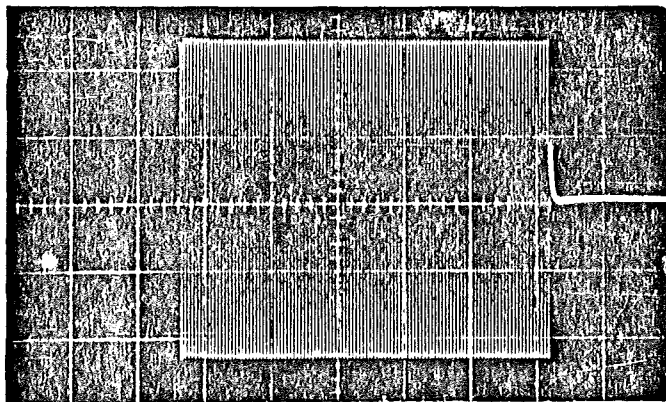
Figure 21



The System



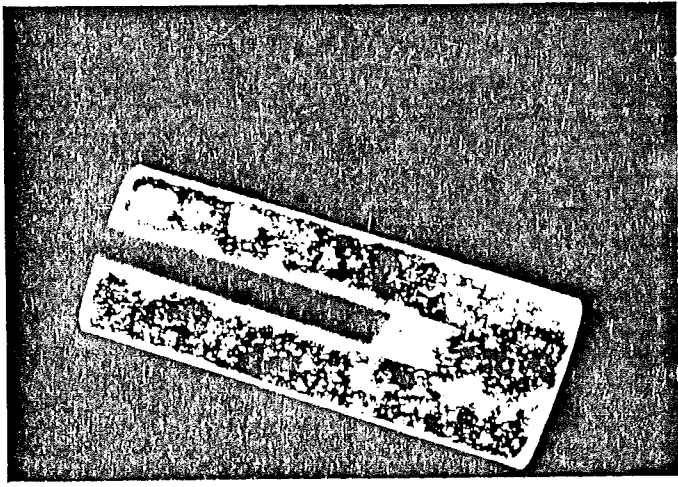
20 msec pulse
1000 hertz



100 msec pulse
1000 hertz

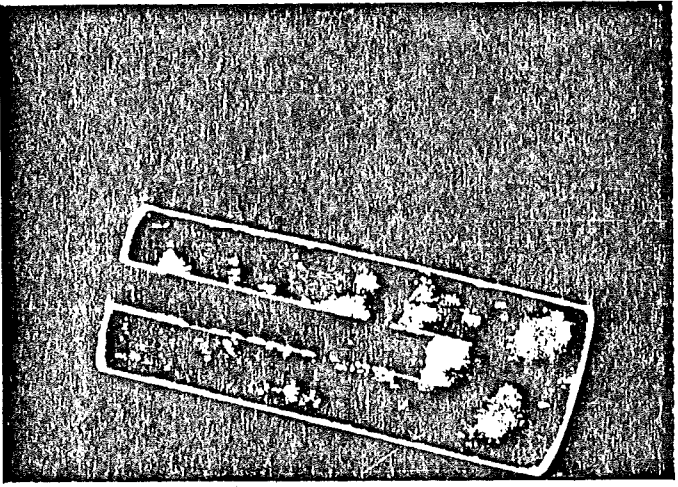
Figure 22

53 625V 125Hz 1.0s



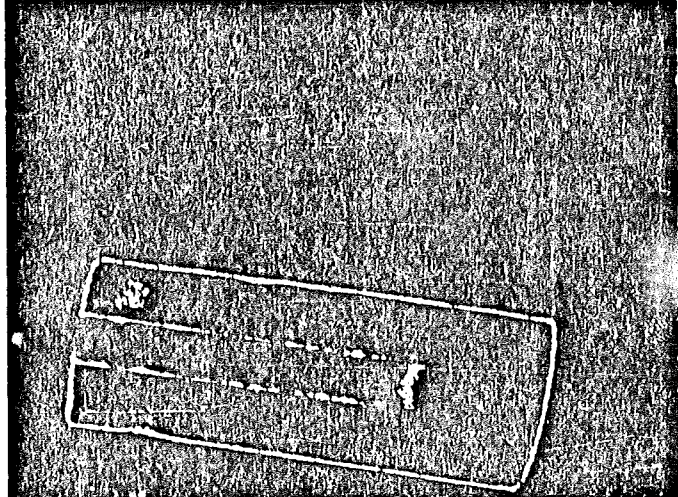
625 volts
R.M.S.
125 Hz.
1.0 sec.

54 525V 125Hz 1.0s



525 volts
R.M.S.
125 Hz.
1.0 sec.

55 475V 125Hz 1.0s



475 volts
R.M.S.
125 Hz.
1.0 sec.

Figure 23

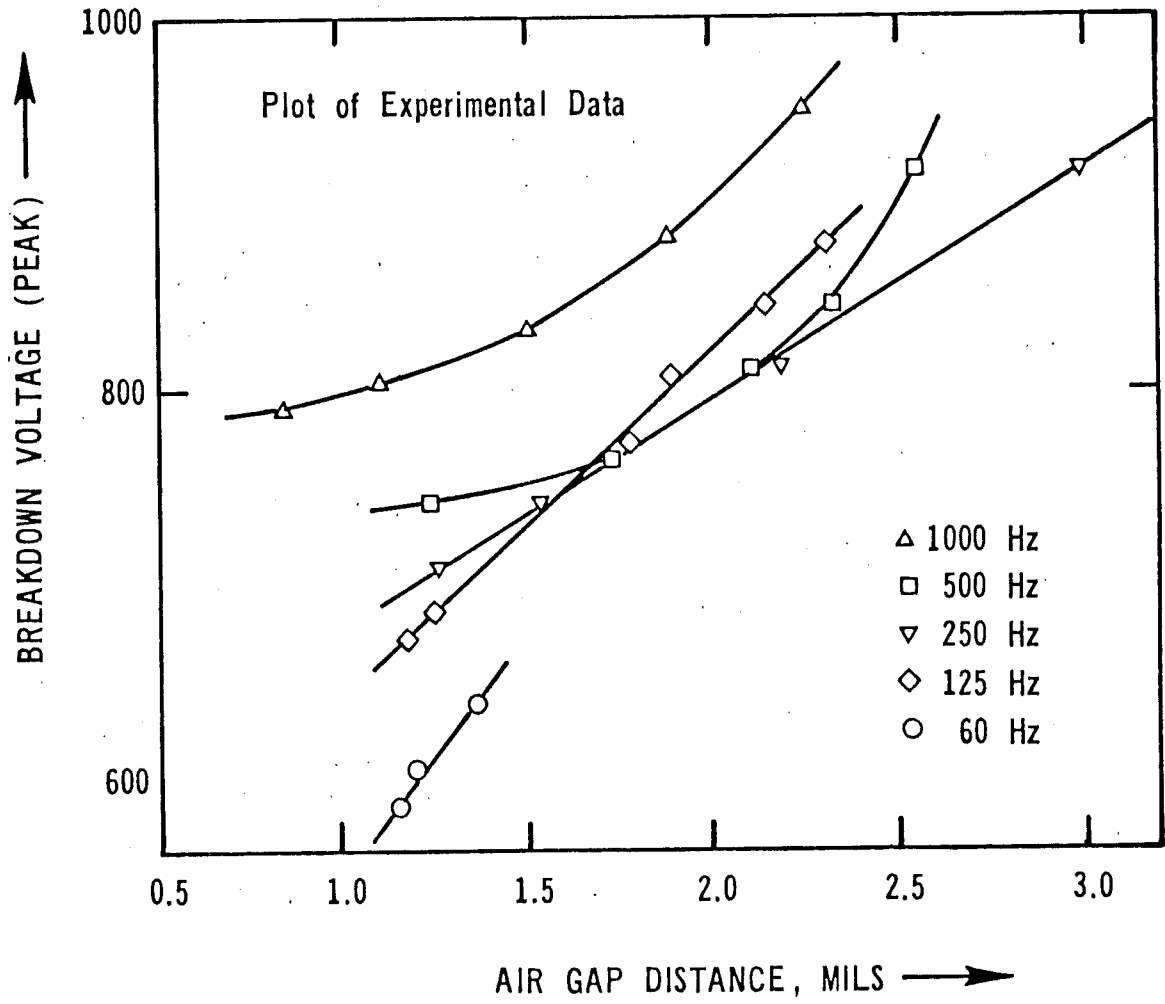


Figure 24

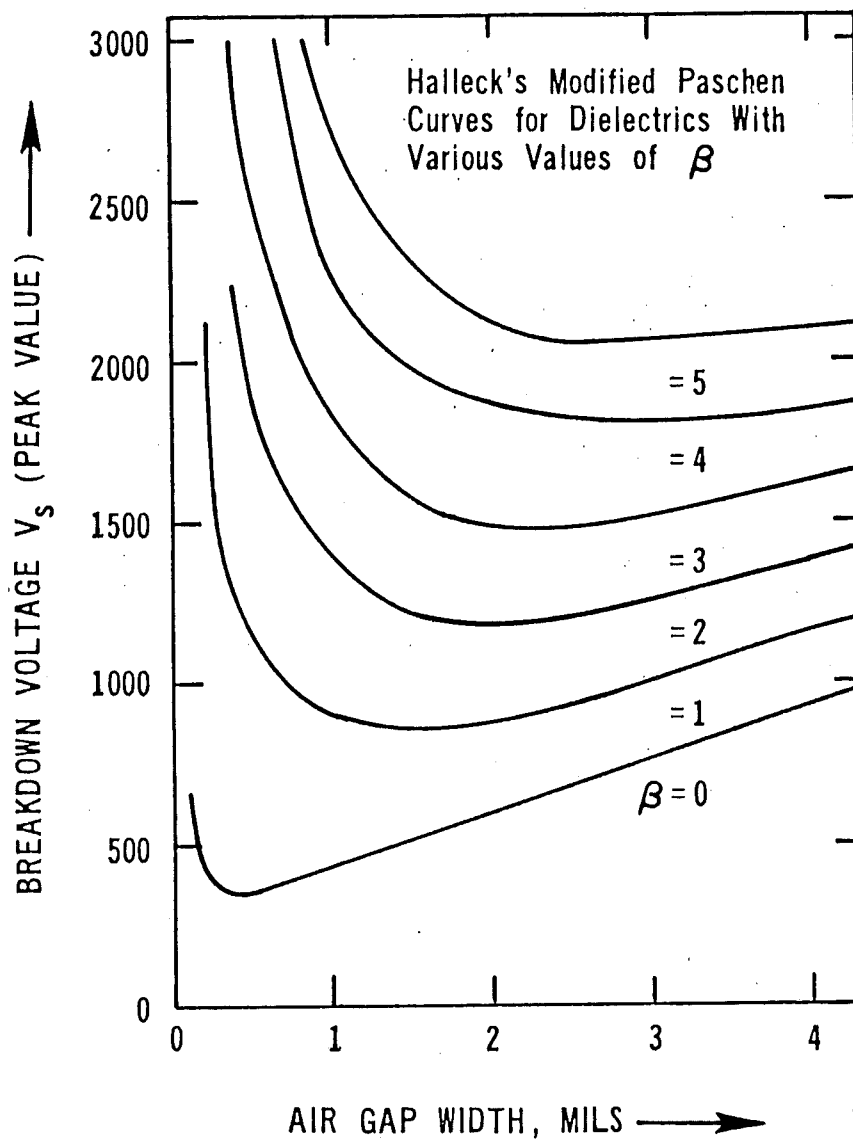


Figure 25

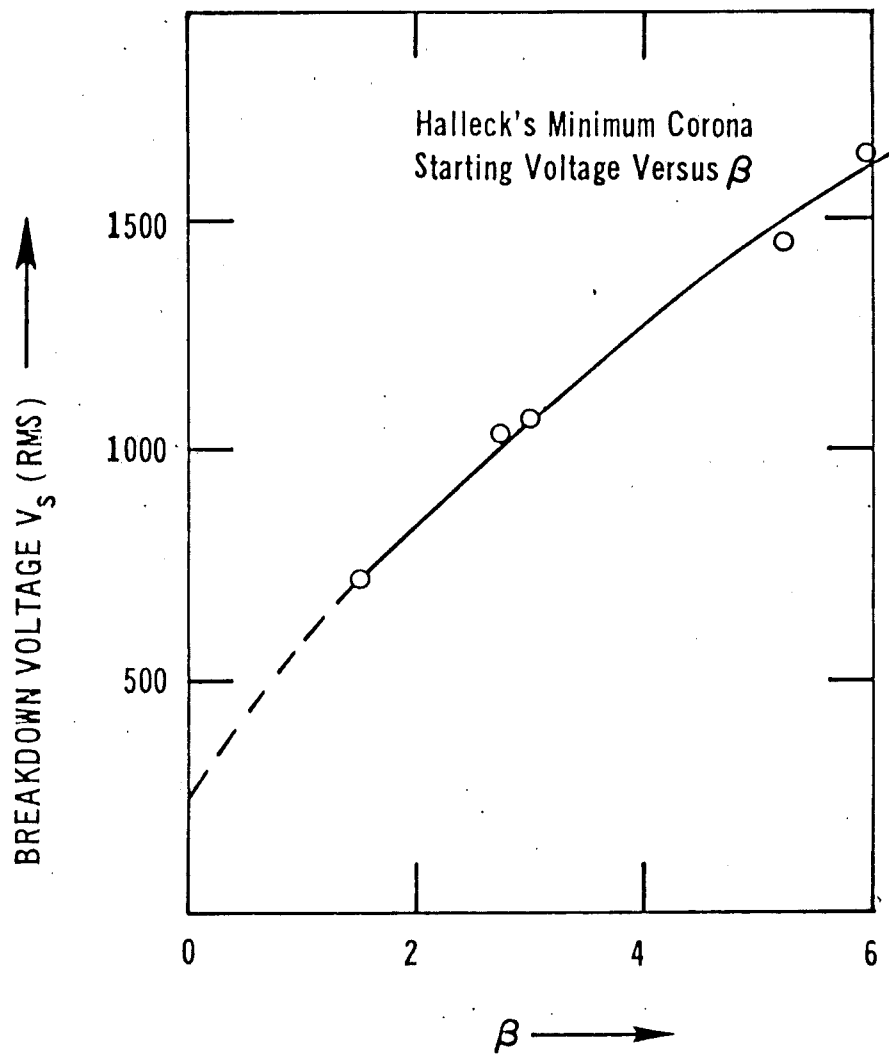


Figure 26

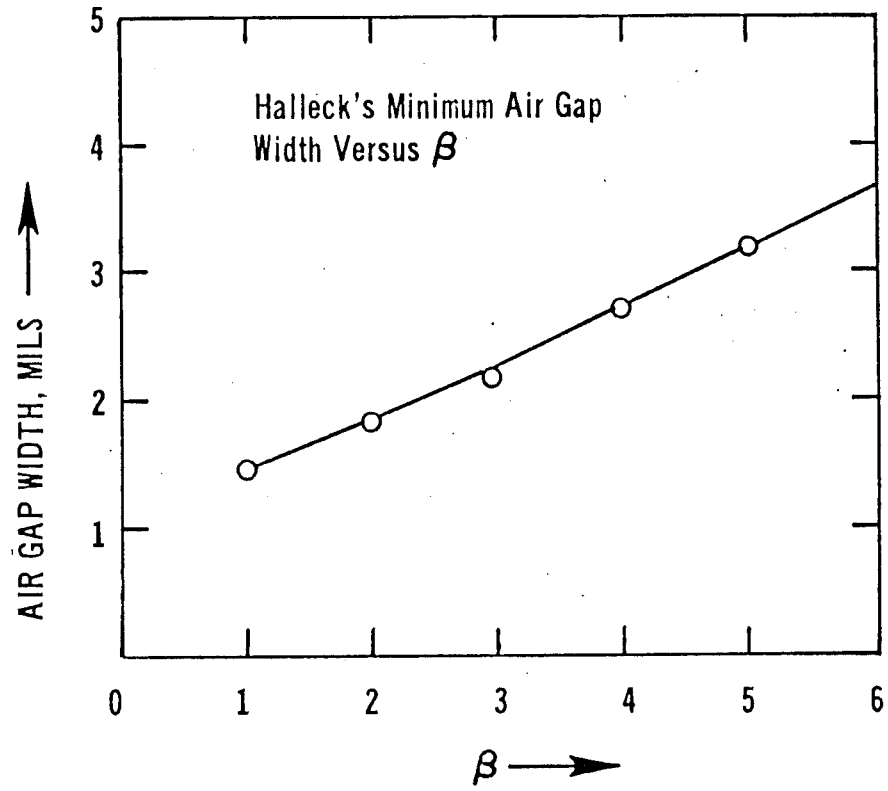


Figure 27

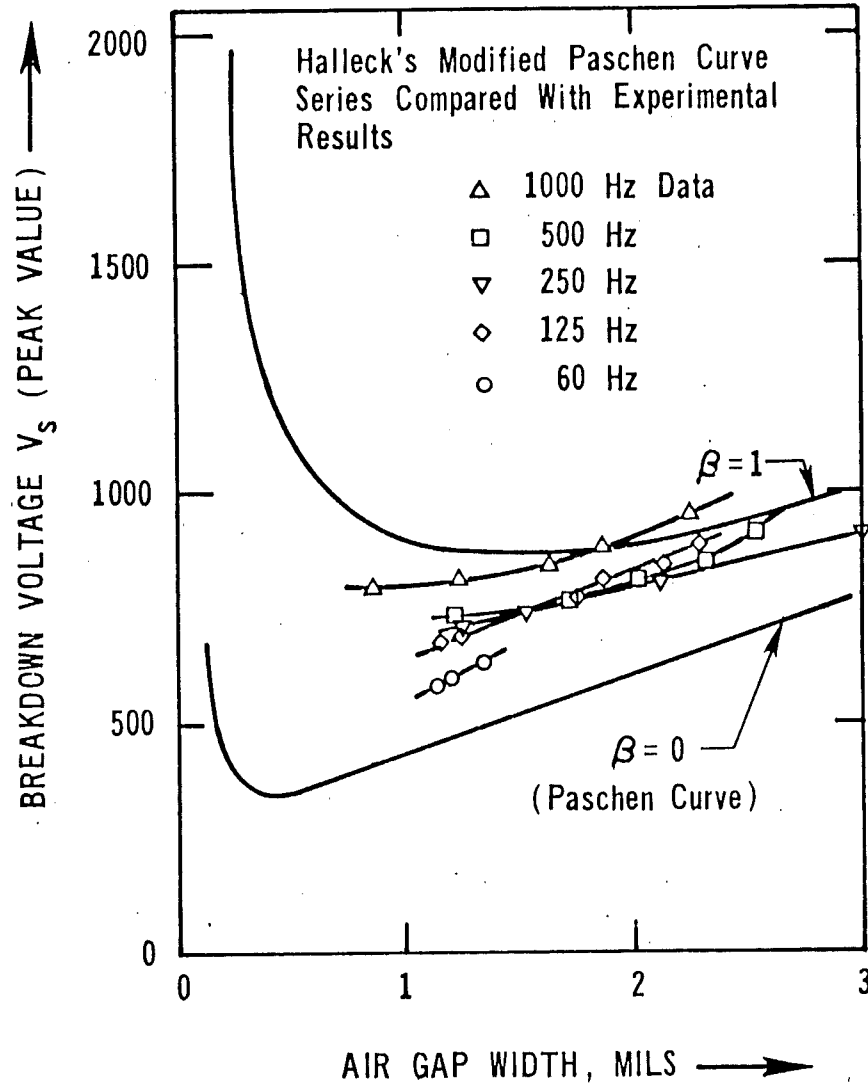
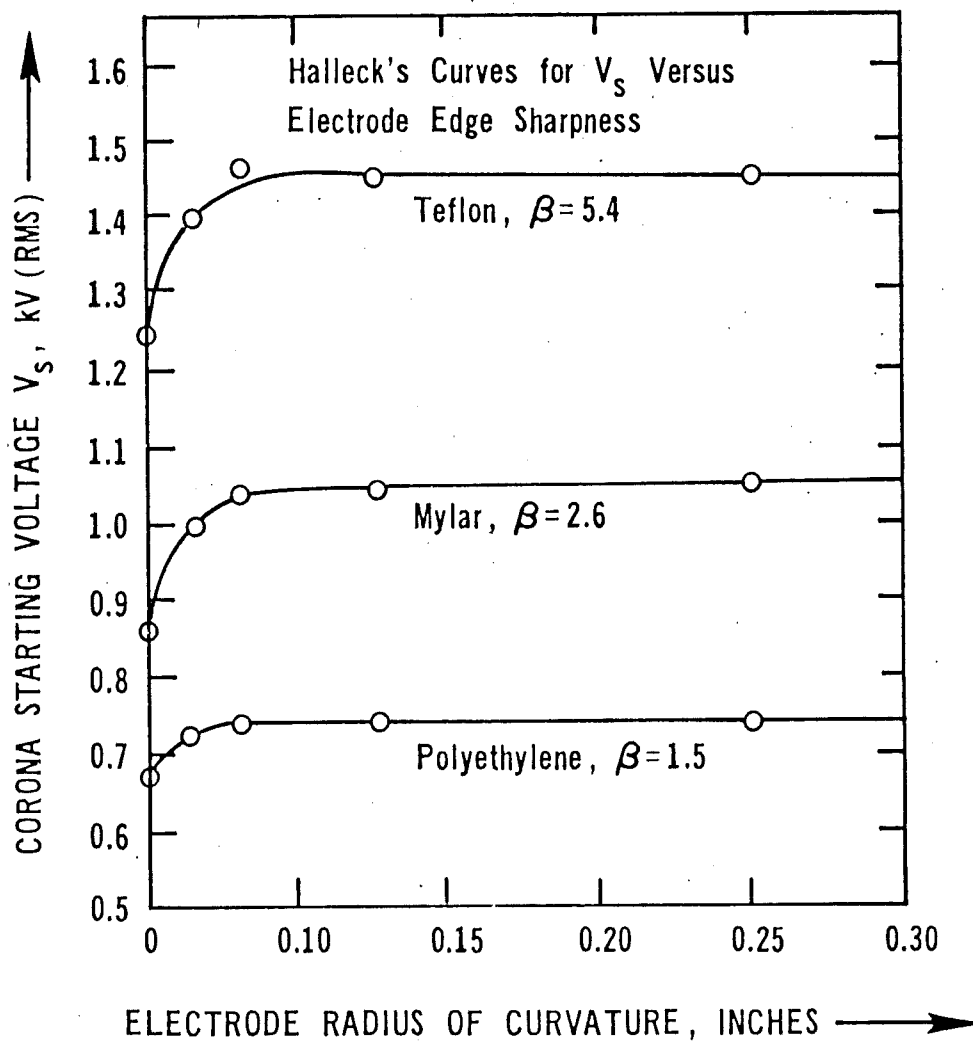


Figure 28



Appendix

A Brief Bibliography of Useful Reference Texts

1. Penning, F. M. Electrical Discharges in Gases, MacMillan, New York (1957). This is an excellent introductory monograph which serves as a perfect starting point for the technician with no prior knowledge of general discharge and breakdown phenomena. Penning introduces all pertinent terminology and summarizes all the classical experiments and theoretical work in the field. Easy reading.
2. Cobine, J. D. Gaseous Conductors, Dover, New York (1958). This is a good practical compilation of engineering work in the field prior to 1941. It contains a large amount of theoretical derivations and is more mathematical than Penning's expository treatment. It also contains a wealth of handy semi-empirical high voltage engineering equations.
3. Llewelyn-Jones, F. Ionization and Breakdown in Gases, Methuen and Co., London (1957). A useful but brief treatment of breakdown theory and mechanisms, with some detail sacrificed in the interests of brevity. It contains a thorough development of theoretical background, yet is still brief and readable.
4. Peek, F. W. Dielectric Phenomena in High-Voltage Engineering, McGraw-Hill, New York (1929). Cited extensively by Cobine, Peek's book is a somewhat dated treatment of practical high voltage engineering, with many graphs of experimental data and sample calculations.

5. Meek and Craggs (editors). Electrical Breakdown of Gases, John Wiley, New York (1978). This is a very recent and up-to-date compilation of current theory and practice in the field of electrical breakdown. Each chapter deals with a different specialty and each contains very extensive literature reviews. D.T.A. Blair's chapter on breakdown voltage characteristics is the perfect follow-up to Penning's introductory work, described earlier.