

CONTENTS

SYMBOLS	ix
CHAPTER I. METHOD OF TREATMENT	1
CHAPTER II. INTRINSIC BREAKDOWN	5
2.1. The Experimental Concept of Intrinsic Electric Strength	5
2.2. Earlier Theories of Intrinsic Breakdown	12
2.3. Electrons in Dielectrics	23
2.4. Electronic Breakdown: Fröhlich's Theories of Amorphous and Crystalline Breakdown	37
2.5. Magnitude of the Intrinsic Electric Strength	55
2.6. Effect of Temperature	74
2.7. Effect of Thickness	83
2.8. Time Effect and Impulse Breakdown	89
2.9. Conductivity, Polarization, and Space Charge	96
2.10. Partial Breakdown	103
CHAPTER III. THERMAL BREAKDOWN	115
3.1. General Principles	115
3.2. Typical Solutions	126
3.3. Concentric Cylinders	138
3.4. Lateral Cooling	143
3.5. Defects and Partial Breakdown	144
3.6. The Time Factor in Thermal Breakdown	154
3.7. Thermal Breakdown in Practice	157
CHAPTER IV. BREAKDOWN CAUSED BY DISCHARGES	163
4.1. Early Recognition	163
4.2. Gaseous Discharges	166
4.3. Mechanism and Detection of Internal Discharges	171
4.4. The Influence of Internal Discharges on Electric Strength	195
4.5. External Discharges	207
4.6. Impulse Breakdown	218
4.7. Surface Breakdown	223
CHAPTER V. ELECTROCHEMICAL DETERIORATION	236

CHAPTER VI. DIELECTRIC BREAKDOWN IN PRACTICE	245
6.1. General	245
6.2. Working stresses	246
6.3. Over-voltages	255
6.4. Notes on Insulation Testing	259
6.5. Future Developments	266
INDEX.	268