

Contents

Cleaning of Electron Tubes and Vacuum Components	1
Cleaning procedures	3
Electropolishing	18
Electroplating and Stripping	23
Plating in general	23
Plating and stripping baths	25
Stripping procedures	33
Heat-Treating and Brazing	35
Hydrogen brazing	35
Preparation of the work for brazing	39
Bottle brazing	39
Stainless steel	41
Heat-treating, degassing, cleaning, and brazing austenitic stainless steel in dry hydrogen	41
Induction Heating: Radio-Frequency Heating, Bombarding	51
Glass-to-metal Seals	54
Metal and Ceramic Bonding	67
Tube Laboratory Procedures	75
Heater Design and Preparation	80
Tungsten filaments—direct emitters	86
Thoriated tungsten emitters	89
Nickel Bases for Oxide-coated Cathodes	93
Other cathode materials	95
Oxide-coated Cathodes General	96
Philips cathodes	103
Getters and Getter-ion Pumping	105
Titanium-ion pumping	106
Cryopumping	110
Ultrahigh Vacuum	110
Vacuum Techniques, Design Procedures, and Construction of Vacuum Tubes and Vessels	112
Metals in the construction of vacuum systems	116
Step-type demountable metal vacuum joints	117

X CONTENTS

Gas Filling of Tubes	119
Hydrogen-filling by diffusion	121
Metal Bellows	124
Procedure for Assembling Tubes	129
Leak Detection	134
Vapor Pressure	138
Vapor pressures of the elements	142
Glossary—Exhaustive Listing of Terms, Definitions, Materials, etc.	149
Author Index	583
Subject Index	589