

Table of Contents

	<u>Page</u>
FOREWORD.....	viii
SUMMARY.....	xi
I. SOURCE CONDITIONS	
I.1 Introduction.....	I-1
I.2 The Data Base on Present Devices.....	I-2
I.3 Theoretical Understanding of Operating Conditions.....	I-6
I.4 Predictions of Operating Conditions for Future Machines.....	I-7
I.5 Assessment of Operating Conditions and Future Needs.....	I-9
References for Chapter I.....	I-10
II. SYSTEMS INTEGRATION	
II.1 Introduction.....	II-1
II.2 HHF Components Location and Description.....	II-1
II.3 Systems Integration Considerations.....	II-20
II.4 Key Issues and R&D Needs.....	II-33
References for Chapter II.....	II-36
III. MATERIALS AND PROCESSES	
III.1 Operating Conditions.....	III-1
III.2 Plasma Side Materials.....	III-5
III.3 Heat Sink Materials.....	III-10
III.4 Interface/Attachment.....	III-19
III.5 Fabrication.....	III-22
III.6 Other Issues-Tritium Permeation.....	III-31
III.7 Materials and Processes Technology Needs.....	III-32
References for Chapter III.....	III-38

IV. THERMAL HYDRAULICS		
IV.1 Introduction.....	IV-1	
IV.2 Three High Heat Flux Heat Removal Techniques.....	IV-1	
IV.3 Comparison of Three High Heat Flux Heat Removal Techniques.....	IV-10	
IV.4 Conclusions and Recommendations.....	IV-11	
References for Chapter IV.....	IV-15	
V. THERMOMECHANICAL RESPONSE		
V.1 Thermal Response.....	V-1	
V.2 Structural Response.....	V-9	
V.3 Failure Analysis.....	V-15	
V.4 Design Criteria.....	V-20	
V.5 Thermomechanical Testing.....	V-20	
V.6 R&D Needs.....	V-21	
V.7 Critical Issues.....	V-26	
References for Chapter V.....	V-29	
VI. ELECTROMAGNETIC RESPONSE		
VI.1 Introduction to the Issues.....	VI-1	
VI.2 Eddy Current Codes.....	VI-5	
VI.3 Coupling of Eddy Currents to Thermomechanical Response.....	VI-6	
VI.4 Conclusions and Recommendations.....	VI-10	
References for Chapter VI.....	VI-13	
VII. HIGH HEAT FLUX COMPONENT TEST FACILITIES.....		VII-1
VIII. INSTRUMENTATION AND CONTROL		
VIII.1 Introduction.....	VIII-1	
VIII.2 Measurement Requirements.....	VIII-2	
VIII.3 Control Requirements.....	VIII-6	
VIII.4 Operating Environment and Device Interfacing.....	VIII-11	
VIII.5 Instrumentation and Control Techniques.....	VIII-14	
VIII.6 Conclusions and Recommendations.....	VIII-18	
References for Chapter VIII.....	VIII-22	