Contents

Acknowledgement i
Nomenclature ii
List of tables v
List of figures v
List of photographs vii
Abstract viii
Publications from Ph.D. work xv

Chapter 1

Introduction and Review of literature 1

1.1. Pool boiling 1
1.2. Parameters affecting pool nucleate boiling 3
1.3. Available models for the prediction of heat transfer in pool nucleate boiling. 4
1.4. Correlations of Nucleate boiling heat transfer data 9
1.5. Flow boiling heat transfer 15
1.6. Flow boiling Critical Heat Flux 16
1.7. Mechanisms responsible for CHF in Sub-cooled and Saturated Flow boiling. 19
1.8. Parameter affecting CHF in Sub-cooled flow boiling 22
1.9. Parameter affecting CHF in Saturated flow boiling 25
1.10. CHF Prediction methods 28
1.11. Available correlations for the estimation of Sub-cooled boiling CHF 31
1.12. Analytical Models for the Prediction of Sub-cooled boiling CHF 36
1.13. Available correlations for the estimation of saturated boiling CHF 40
1.15. Post CHF heat transfer 49
1.16. Prediction methods in Post CHF heat transfer 55
1.17. Scope of work 59
Chapter 2
A correlation to predict heat transfer coefficient in Nucleate boiling on cylindrical heating elements

2.1 Scope
2.2 Introduction
2.3 Available experimental data set
2.4 Available correlation equations
2.5 Present analysis
2.6 Remarks

Chapter 3
An experimental study on nucleate boiling with Copper-Forane surface-fluid combination

3.1 Scope
3.2 Introduction
3.3 Description of Experimental setup
3.4 Correlation of the data
3.5 Comparison of the data with the correlations of other investigators
3.6 Remarks

Chapter 4
Performance study of an evaporator tube working under High heat fluxes

4.1 Scope
4.2 Introduction
4.3 Model of Mozharov
4.4 Correlation for Slow Burnout
4.5 Numerical procedure
4.6 Discussion of Results
4.7 Remarks
Chapter 5

A correlation to evaluate critical heat flux in small diameter tubes under sub-cooled conditions of the coolant.

5.1 Scope 100
5.2 Introduction 100
5.3 Dimensionless criteria for Sub-cooled flow boiling 103
5.4 Correlation for Critical heat flux in sub-cooled flow boiling (X<0) 107
5.5 Correlation for Critical heat flux in saturated flow boiling (X>0) 110
5.6 Comparison with other correlations 111
5.7 Remarks 113

Chapter 6

Conclusions

6.1 Summary of the present work 114
6.2 Scope for future work 120

References 176