PREFACE

Chapter I is of introductory nature, emphasizing the utilization of solar energy among the available renewable energy source as an answer to the severe energy shortage already existing in many parts of the developing countries; choice of CPC over flat plate collectors and other concentrators for solar thermal conversion with reasonably good efficiency at higher temperature and the use of steam generating CPC modules as a steam cooker.

The present work is an attempt to design and fabricate compound parabolic concentrator modules with reduced gap losses and study its optical and thermal performances as a low pressure steam generator and also to use the same with a pressure cooker to study its performance as a solar steam cooker.

A brief review of the work carried out on various aspects of CPC, viz., different designs with main emphasis on gaplossless designs, truncation of CPC and optical and thermal performance are presented in Chapter II.

Chapter III describes the detailed design and fabrication methods of two CPC modules of medium concentration 2.5X (CPC I with oversized reflector and CPC II with a 'V' groove at the bottom of the reflector) developed, using fibre glass as substrate material for reflector and non-evacuated selectively coated receivers.

The test details and the results of the performance analysis of the two CPC modules are presented in Chapter IV.

Chapter V gives a simulation model of the CPC collectors to predict their performance and to compare the same with the experimental results.
Experimental details of in situ steam generation with CPC modules and their applications to pressure cooking are presented in Chapter VI.

Chapter VII gives a brief summary and conclusions of the present work.