



INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI  
SHORT ABSTRACT OF THESIS

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Programme of Study : Ph.D.

Thesis Title:

**Development and Performance Assessment of Gaseous fuel based Porous Radiant Burners**

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Thesis Submitted to the Department/ Center : School of Energy Science and Engineering

Date of completion of Thesis Viva-Voce Exam : 31-08-2023

Key words for description of Thesis Work : Porous Radiant Burner, Thermal efficiency, Emissions, Lifecycle Assessment and Techno-economic Assessment

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SHORT ABSTRACT

This thesis presents the development and performance testing of Porous Radiant Burners (PRBs) using different fuels, including LPG, natural gas, and biogas, for cooking and industrial applications. These PRBs show promise in enhancing thermal efficiency and reducing emissions compared to conventional burners. In addition, an analytical model was developed to determine the factors influencing the primary air entrainment in a PRB. And experimental investigations were performed to check the validity of the developed analytical expression. Further, performances of the developed PRBs were assessed in terms of thermal efficiency and emissions. Through experimental investigations, it was found that the developed LPG-PRB and NG-PRB, exhibit improved thermal efficiency and fuel savings. Furthermore, a BG-PRB cookstove for domestic use was developed and demonstrated substantial gains in thermal efficiency and reduced emissions compared to conventional biogas burners. Environmental and economic assessments of the developed PRBs were conducted, highlighting the environmental benefits and cost savings associated with the use of these innovative PRBs. This research work contributes to the sustainable energy transition and offers practical solutions for cleaner and more efficient energy utilization in cooking and Industrial applications.