

CHAPTER 58
TECHNOLOGY
MECHANICAL ENGINEERING

Doctoral Theses

562. CHAUDHARY (Rajiv)
Design and Development of a New Generation Bio-Diesel Reactor & Use of Bio-diesel Produced in a Ci - Engine Performance Emission and Combustion Characteristics.
Supervisors : Dr. S. Maji and Dr. P. B. Sharma
Th 18951

Abstract

Biodiesel reactor of 1000 litre per batch capacity has been designed, developed and commissioned successfully. It is able to produce biodiesel from a wide variety of vegetable oils, with adequate control, better utilization & less wastage of the chemicals used, and being a faster unit with flexibility. The biodiesel is produced from two non edible vegetable oils, Jatropha curcas and Pongamia pinnata, which are of great potential and prospects in Indian context. Biodiesel can be produced by different methods, but in this work, two stage integrated pre-esterification of free fatty acid, followed by base catalyzed transesterification is adopted, because of low temperature and pressure conditions, high yield, with no intermediate compounds.

Contents

1. Introduction. 2. Literature review and objective of the work. 3. Designing and development of biodiesel reactor. 4. Biodiesel production technique. 5. Properties and performance evaluation. 6. System development: Test methods & procedures. 7. Results and discussion. 8. Conclusion. Future scope of the work. References and Annexure.

563. SINGH (Ramesh Chandra)
Thermohydrodynamic Analysis of Lubricated Piston Rings of Internal Combustion Engine.
Supervisors : Dr. S. Maji and Dr. R. K. Pandey
Th 19098

Abstract

Studies mathematically hydrodynamic lubrication of the interfaces formed between the cylinder liner and various surface profiles of the piston rings for reducing the frictional losses at the interfacial contacts. In the investigation reported herein, four single continuous surface profile (Catenoidal, Cubic, Exponential, and Parabolic) on the face (surface in contact with cylinder liner) of piston rings have been considered for arriving on the best efficient face profile among these.

Contents

1. Introduction. 2. Literature review and objective of study. 3. Mathematical model for thermohydrodynamic analysis of lubricated Ring/Bore interface. 4. Experimentation with an IC engine using exponential face profile to piston rings. 5. Experimental studies for role of surface dimpling on the performance of lubricated sliding contact. 6. Conclusions and suggestions for future study. References. Appendixes.

564. SURESH LAL
Suppression of Diffusion Flames with Water Mist.
Supervisors : Dr. Abhijit Kushari and Dr. S. Maji.
Th 19026

Abstract

In this study the use of nitrogen as atomizing gas and its effect on diffusion flame suppression performance was evaluated. The critical mist concentration required for suppression of unobstructed and obstructed diffusion flame reduced by 30-50% by use of nitrogen as atomizing gas. The experimentally measured data on critical concentration of mist required for suppression of diffusion flames in large enclosed spaces forms the basis for design of water mist system. The design concentration of mist will be MEC X Factor of Safety (FOS). The FOS will be in the range of 1.5 to 2.

1. Introduction. 2. Diffusion flame suppressing agents- Literature survey. 3. Conclusions from literature survey and statement of the problem. 4. Experimental setup and test procedure. 5. Theoretical investigations and computational technique of atomisation process. 6. Results and discussions. 7. Conclusions. References. Appendices.