

PERFORMANCE OF BIODIESEL BLENDS ON COMPRESSION IGNITION ENGINE

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SUPERVISOR'S DECLARATION

We hereby declare that we have checked this project and in our opinion this project is satisfactory in terms of scope and quality for the award of the degree of Master of Mechanical Engineering.

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I hereby declare that the work in this thesis is my own except for quotations and summaries which have been duly acknowledged. The thesis has not been accepted for any degree and is not concurrently submitted for award of other degree.

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LIST OF SYMBOLS

A_p	Piston Face Area of All Pistons
\dot{m}_a	Steady-state Flow of Air into the Engine
η_{bth}	Brake Thermal Efficiency
N	Engine Speed
n	Number of Revolutions per Cycle
ρ_a	Inlet Air Density.
τ	Torque
\bar{U}_p	Average Piston Speed
V_{disp}	Displacement Volume
W_b	Brake Work of One Revolution
π	Radian

LIST OF ABBREVIATIONS

ABNT	Brazilian Association of Technical Standards
ANP	National Agency of Petroleum, Natural Gas and Biofuels
AOCS	American Oil Chemists' Society
ASTM	American Society for Testing and Materials
ASTMD6751	American Standard Specifications for Biodiesel Fuel Blend Stock
B100	100% Biodiesel
B15	15% Biodiesel blended with 85% mineral diesel
B20	20% Biodiesel blended with 80% mineral diesel
B5	5% Biodiesel blended with 95% mineral diesel
B50	50% Biodiesel blended with 50% mineral diesel
BDC	Bottom Dead Centre
BMEP	Brake Mean Effective Pressure
BSFC	Brake Specific Fuel Consumption
CAD	Crank Angle Degree
CFD	Computational Fluid Dynamics
CI	Compression Ignition
CN	Cetane number
CP	Cloud Point
CR	Compression Ratio
D2	Mineral Diesel
DF	Diesel Fuel
EBB	European Biodiesel Board
ECE	External Combustion Engines

EN14214	European Standard Specifications for Biodiesel
EN590	European Automotive Diesel Standard
EU	European Union
HHV	Higher heating value
ICE	Internal Combustion Engines
ID	Ignition Delay
IEA	International Energy Agency
ISO	International Standard Organisation
ISO	International Standard Organization
LHV	Lower heating value
MEP	Mean Effective Pressure
MFB	Mass Fraction Burned
MS123:1993	Malaysian Standard for Diesel Fuel
NBB	National Biodiesel Board
PLPO/PD	Process Liquid Palm Oil/Petroleum Diesel
PP	Pour Point
PRC	People's Republic of China
ROHR	Rate of Heat Release
RPM	Revolution per Minute
SI	Spark Ignition
SOC	Start of Combustion
SOI	Start of Injection
SVO	Straight Vegetable Oil
TDC	Top Dead Centre