

Blending of 0.5% MTBE With Petrol in Single Cylinder Two Stroke Petrol Engine

Harsh Soneji¹, Kapil Raval², Jaymin Thakkar³, Indravadan Zala⁴
^{1,2,3,4} Dept. of Mechanical Engineering,
Government Engineering College, Patan, GTU,
Gujarat, India

Abstract: Improving Internal Combustion (IC) engine efficiency is a prime concern today. A lot of engineering research has gone into the improvement in efficiency, By using additives and blending it with gasoline improve engine performance. In this work, oxygenated additives like methyl tert butyl ether (MTBE) are identified for the experimental investigation by blending it to 0.5% with gasoline. The performance analysis was examined in single cylinder two stroke petrol engine with additives blend with gasoline.

Key Words: MTBE (Methyl tert butyl ether), blending, Tachometer, two stroke engine, Brake Dynamometer

1. INTRODUCTION

Engine performance is measured with 0.5% blended MTBE with petrol with use of brake dynamometer. The two stroke petrol engine test ring has two-stroke single cylinder air cooled petrol engine by Bajaj, brake dynamometer apparatus, fuel measurement apparatus and tachometer apparatus are available with test kit.

2. NOMENCLATURE:

MTBE: -Methyl tert butyl ether

3. APPARATUS WITH SPECIFICATION:

Single cylinder two stroke air cooled petrol engine
Made by: Bajaj Auto, 150cc power 7.5BHP @ 5500rpm, torque 10.8NM @3500rpm
Engine weight: 103kg
Tachometer
Type: electrical type (RPM)
Fuel measurement tank
Mounted on a sturdy iron stand, burette tube and two valve connections.
Capacity: 4 liter
Stopwatch

Table -1: Properties of MTBE

Properties	Methyl tert butyl ether
Molecular formula	CH ₃ OC(CH ₃) ₃
Octane number	116
Molecular weight (g/mol)	88
Boiling point (°C)	55.3
Oxygen content (% wt)	18.2
Vapor pressure (mmHg at 25°C)	270

Table -2: Physical and chemical properties of petrol, MTBE

Property	Petrol	Methyl tert butyl ether
Specific gravity	0.72	0.7463
Kinematic viscosity	1.37	1.36
Flash point (°C)	-43	-11
Fire point (°C)	-13	-9
Pour point (°C)	-32	-18
Gross calorific value (kJ/kg)	45650	45738
Acidity as mg of KOH/gm	0.024	0.012
Density@ in gm/cc	0.71	0.7452

4. EXPERIMENT PROCEDURE:

In theoretical cycle, we assume that there is no friction loss or exhaust gas loss, there is no variation sp. heat of gases with temperature. Therefore, the efficiency of cycle is independent of these. But in actual cycle on which the engine works must depend on these factor and due to these losses the efficiency of the engine is less than that of theoretical cycle. Engines are required to be tested mainly for on a purposes the basic measurements which usually should be undertaken to evaluate the performance of an engine are

- Brake power
- Total fuel consumption
- Brake thermal efficiency
- Friction power
- Indicated power
- Indicated thermal efficiency
- Mechanical efficiency

4.1. Procedure:

1. Check the level of mixture of petrol and 2T oil because in two stroke petrol engine lubrication is giving to engine directly with petrol.
2. Start the engine by kick with no load.
3. As the engine start continue for two minutes.
4. Put a light load in the engine with loading screw.
5. Achieving steady state condition, note down all the necessary data (fuel consumption, brake drum speed with tachometer.)
6. After noting down repeat the step 4 and 5 for different load.
7. Now add mixture of 0.5% MTBE and petrol in tank and again repeat 4 and 5 for different load.
8. Before stop the engine remove the load and run the engine on no-load for two minutes.
9. Stop the engine.

5.GRAPHS:

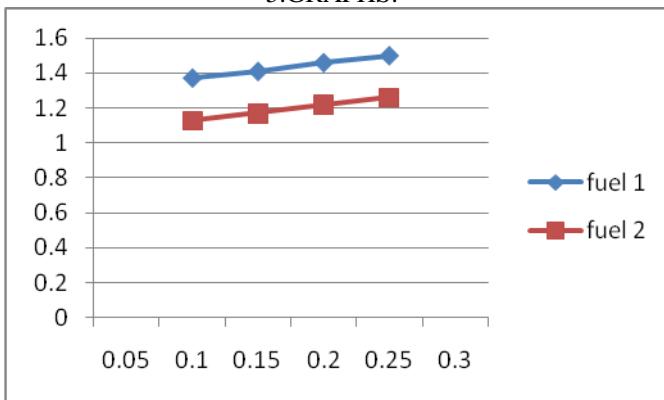


Chart -1: B.P. vs I.P.

6. CONCLUSIONS

- The general conclusion drawn for the results of this work for petrol engine are as follows as adding 0.05% MTBE in petrol efficiency increases 3.1%.
- Adding MTBE in petrol helps in increasing octane number of fuel and better combustion.
- The impact of modified fuel on combustion and performance parameters was clearly investigated in this study over the entire loading condition and observation are noted.
- Increase in efficiency 3.1% was observed when fuel modified from pure petrol to 0.05% MTBE and 99.5% petrol.

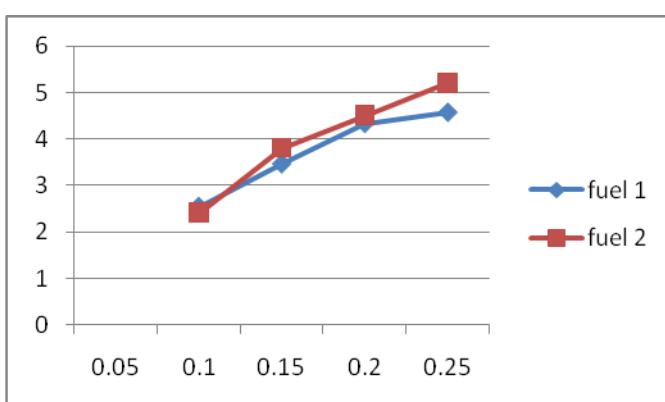


Chart -2: B.P. vs η_{bth}

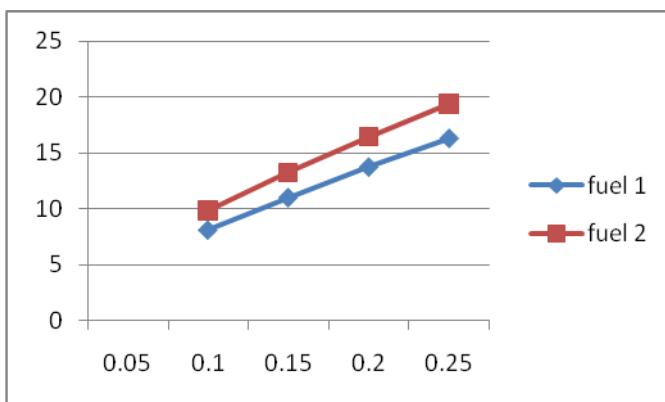


Chart -3: B.P. vs η_m

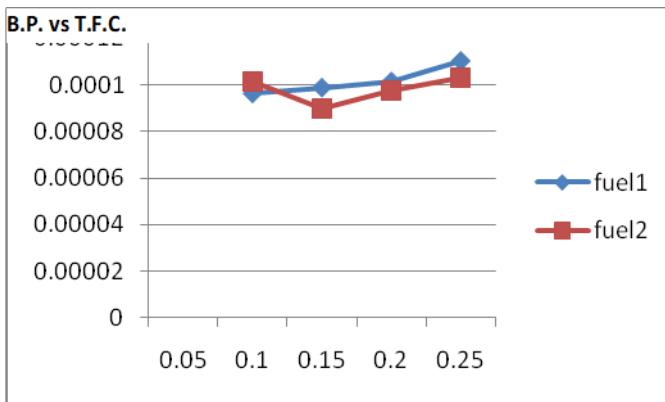


Chart -4: B.P. vs T.F.C.

7. REFERENCES

- [1] Unit 7 engine testing – IGNOU
- [2] Characterization on gasoline engine using MTBE and DIE additives Volume 04 / March 2017(IJERT).