

EXPERIMENTAL VALIDATION OF AFTERMARKET FUEL SAVING DEVICE  
(AIR BOOM)

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This report is presented in Partial fulfillment of the requirements for the award of  
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“I admit that this report is on my own work except for summary and quotes that I have stated the source for each of them”

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Date : 18 MAY 2010

*Especially for beloved mom, dad and family*

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Hope this report will become the guideline and reference for the other students in the future.

## ABSTRACT

Air Boom is a new product aftermarket that based on nanotechnology and produced from a company from Germany. From the information obtained, Air Boom's functions are as a fuel saver and can improve the power of an engine. This Air Boom will be installing in the air filter or air box's of the car. When income air flows through it, the molecules of air will be separate into smaller size. These smaller molecules of air will then flow into the engine combustion chamber. This air will increase the burning power and the combustion in the engine will be more efficient and more complete. As a result, power and torque of the engine will be increase. For the long distance driving, it will save more fuel. For literature review study, Air Boom is a new product in the market. So, it is quite difficult to find detailed information about this product. The next step is to choose and make an experimental research for this product. It is carried out to study the effects of Air Boom usage whether both customer and supplier's claims are true. Therefore, Chassis dynamometer is chosen to make a test about this product in terms of torque, power and brake specific fuel consumption. The experiment is carried out on a car that does not use Air Boom and then it is repeated on same car with Air Boom installation. Then, the results of these experiments will be compared to the supplier's claims to validate the results desired.

## ***ABSTRAK***

Air Boom ialah satu produk baru yang berteraskan teknologi nano (nanotechnology) yang dihasilkan oleh syarikat dari Jerman. Mengikut maklumat yang diperolehi, Air Boom ini berfungsi sebagai penjimat bahan bakar dan dapat meningkatkan kuasa enjin kenderaan. Pelekat Air Boom ini akan di pasang di dalam kotak angin kenderaan. Apabila udara mengalir masuk melaluinya, molekul-molekul udara akan terpecah kepada saiz yang lebih kecil. Pecahan udara ini seterusnya akan memasuki ruang pembakaran di dalam enjin. Justeru, ia akan memantapkan kuasa pembakaran dan pembakaran dalam enjin akan lebih lengkap dan cekap. Hasilnya, kuasa dan daya kilas enjin akan bertambah. Untuk pemanduan jarak jauh, penggunaan bahan bakar juga akan berkurangan hasil daripada penggunaan Air Boom ini. Untuk kajian ilmiah, Air Boom dikenalpasti sebagai produk yang baru di pasaran. Jadi, maklumat berkenaannya adalah terhad. Langkah seterusnya ialah memilih dan membuat eksperimen yang bersesuaian terhadap Air Boom. Eksperimen ini adalah untuk mengetahui sama ada apa yang dicakapkan oleh penjual dan pelanggan alat ini benar atau tidak. Maka, ujian chasis dyno dipilih untuk menjalankan eksperimen terhadap produk ini untuk mendapatkan data berkaitan daya kilas, kuasa dan penggunaan bahan bakar khusus brej (bsfc). Ujian dijalankan terhadap kereta yang tidak menggunakan Air Boom dan diulang pada kereta yang sama yang dipasang Air Boom. Keputusan ujian ini akan dibandingkan.



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**LIST OF SYMBOLS**

|             |   |   |
|-------------|---|---|
| AFR         | = | Air Fuel Ratio  |
| M Air       | = | Mass of Air   |
| M Fuel      | = | Mass of Fuel  |
| M Air Flow  | = | Mass Flow Rate of Fuel  |
| N           | = | Revolution per Minutes (Rpm)                                      |
| N           | = | Number of Cylinder  |
| B           | = | Bore (In Metre)   |
| S           | = | Stroke (In Metre)   |
| Po          | = | Density of Air (Standard Condition, Po =1.181 Kg/M <sup>3</sup> ) |
| $\hat{W}_b$ | = | Brake Power   |
| T           | = | Torque in N-M   |

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## CHAPTER 1

### INTRODUCTION

#### 1.1 Project Background

In this new century, the fuel issues became big problems to the user and people. It is also effects the automobiles development. As a result, there are many types of fuel saving device or product in the market to tackle the fuel issue especially in transportation. Some of them are being promoted to improve the engine performance. Air Boom is one of the fuel saving products. Based on the supplier claim, Air Boom is claimed as a special product because it gives better performance to the engine, as well as saving the fuel. It is also claimed as a health product. So, this project is to validate the performance of this product as claimed by manufacturer.

## **1.2 Problem Statement**

There are many types of devices or products of aftermarket saving fuel and some of them are advertised to improved engine performance. There are some experiments to validate the effects of aftermarket fuel saver device-Air Boom, in relation with engine performance. The experimental was conducted using a chassis dynamometer to analyze engine performance with specifics parameter for engine power and torque.

## **1.3 Objectives**

The objective of this project is to validate the effectiveness of the Air Boom product by experimental method using chassis dynamometer based on supplier and manufacturer's claims which states that this product is claimed to have impact on fuel saving usage in vehicles engine mechanisms and can improve the vehicle's power and torque.

## 1.4 Scopes

The scopes of this project are:

- Literature study of functional and working principles of Air Boom related to increase engine's torque and power performance, reduce fuel emission and saving fuel.
- To identify and choose the suitable type of testing required for product validation.
- Set up procedure and perform the test.
- To identify and choose the suitable equation to analyze the results.
- To perform comparison analysis for validation.
- Compile the final report.
- Make some recommendation for the future study.

## 1.5 Archival Research

The source that been used in archival research for this project are from internet resources and the book resources. The information that gained from the internet resources is just website of supplier that sells the products and testimonials from the customers that had used the Air Boom. Besides, the journal about the function and knowledge about nanotechnologies can be used. While from the book resources, the information that achieved is about the working principle or ion negatives function and about dynamometer. There is no journal that state specifically about air boom because it is a new nanotechnology product. So, it is quite difficult to know more information about this product. But, from all information obtained, it is enough to make an investigation or validation about this product.

## 1.6 Summary

Chapter 1 of this report would be discussed about the problem statement, objectives and the scope about this project. In chapter 2, it covered the literature review about the fuel saving device or product aftermarket. The functional and literature review about Air Boom product also would be included in this chapter.

Then, chapter 3 of this report would be discussing about the method of testing of the product due to the supplier claim. Besides that, chapter 4 covered the raw result and the analysis result of the product's testing.

After that, chapter 5 would be discussing the comparison of the analysis results between the test with and without the product. Lastly, chapter 6 discuss the conclusion and validation of the product based on the performed testing and recommendation for future study.