

## Consumption calculation of vehicles using OBD data

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### Abstract

The European type approval procedure, based on a fixed driving cycle for all vehicles, is not representative of their real on-road usage: the driving style and its influence on consumption and emissions cannot be neglected and their real-world environmental impact is not simple to measure.

The objective of this work is to develop a methodology to calculate in real-time the energy and environmental impact of spark ignition and diesel vehicles.

An on-board instrumentation capable to communicate with the electronic system of the vehicle (OBD/CAN) have been developed to collect all the sensor data available (rpm, vehicle speed, engine load, lambda sensor voltage, catalyst temperature, intake airflow, pressure and temperature etc.) and use them as input for power and consumption models.

The models have been applied on several vehicles and validated on a dynamometer chassis running NEDC and ARTEMIS cycles. Consumption has been measured with the CVS and with a portable emission analyzer (HORIBA OBS-1300).

A calibration procedure has been also developed in which 3 tests on a dynamometer chassis are needed: the maximum power curve, the curve at idle and a curve at fixed rpm varying the engine load. For spark ignition engines, an additional test should be needed to calibrate a coefficient that takes into account of the enrichment during accelerator pedal gradients, but this coefficient is not much variable for different vehicles (~10).

All the vehicles show a difference between measurements and models never greater than 4% so this can be an accurate methodology to calculate the power and consumption of vehicles during their real use.

**Keywords:** Instantaneous Vehicle Consumption, Engine Power, OBD, On-Board Data Collection.

# Consumption Calculation Of Vehicles Using Obd Data

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### **Table of Contents Consumption Calculation Of Vehicles Using Obd Data**

1. Understanding the eBook Consumption Calculation Of Vehicles Using Obd Data
  - The Rise of Digital Reading Consumption Calculation Of Vehicles Using Obd Data
  - Advantages of eBooks Over Traditional Books
2. Identifying Consumption Calculation Of Vehicles Using Obd Data
  - Exploring Different Genres
  - Considering Fiction vs. Non-Fiction
  - Determining Your Reading Goals
3. Choosing the Right eBook Platform
  - Popular eBook Platforms
  - Features to Look for in an Consumption Calculation Of Vehicles Using Obd Data
  - User-Friendly Interface
4. Exploring eBook Recommendations from Consumption Calculation Of Vehicles Using Obd Data
  - Personalized Recommendations

- Consumption Calculation Of Vehicles Using Obd Data User Reviews and Ratings
- Consumption Calculation Of Vehicles Using Obd Data and Bestseller Lists
- 5. Accessing Consumption Calculation Of Vehicles Using Obd Data Free and Paid eBooks
  - Consumption Calculation Of Vehicles Using Obd Data Public Domain eBooks
  - Consumption Calculation Of Vehicles Using Obd Data eBook Subscription Services
  - Consumption Calculation Of Vehicles Using Obd Data Budget-Friendly Options
- 6. Navigating Consumption Calculation Of Vehicles Using Obd Data eBook Formats
  - ePub, PDF, MOBI, and More
  - Consumption Calculation Of Vehicles Using Obd Data Compatibility with Devices
  - Consumption Calculation Of Vehicles Using Obd Data Enhanced eBook Features
- 7. Enhancing Your Reading Experience
  - Adjustable Fonts and Text Sizes of Consumption Calculation Of Vehicles Using Obd Data
  - Highlighting and Note-Taking Consumption Calculation Of Vehicles Using Obd Data
  - Interactive Elements Consumption Calculation Of Vehicles Using Obd Data
- 8. Staying Engaged with Consumption Calculation Of Vehicles Using Obd Data
  - Joining Online Reading Communities
  - Participating in Virtual Book Clubs
  - Following Authors and Publishers Consumption Calculation Of Vehicles Using Obd Data
- 9. Balancing eBooks and Physical Books Consumption Calculation Of Vehicles Using Obd Data
  - Benefits of a Digital Library
  - Creating a Diverse Reading Collection Consumption Calculation Of Vehicles Using Obd Data
- 10. Overcoming Reading Challenges
  - Dealing with Digital Eye Strain
  - Minimizing Distractions
  - Managing Screen Time
- 11. Cultivating a Reading Routine Consumption Calculation Of Vehicles Using Obd Data
  - Setting Reading Goals Consumption Calculation Of Vehicles Using Obd Data
  - Carving Out Dedicated Reading Time
- 12. Sourcing Reliable Information of Consumption Calculation Of Vehicles Using Obd Data
  - Fact-Checking eBook Content of Consumption Calculation Of Vehicles Using Obd Data

- Distinguishing Credible Sources
- 13. Promoting Lifelong Learning
  - Utilizing eBooks for Skill Development
  - Exploring Educational eBooks
- 14. Embracing eBook Trends
  - Integration of Multimedia Elements
  - Interactive and Gamified eBooks

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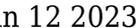
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