



INTRODUCTION

The testing and diagnosis of diesel internal combustion engines are essential processes to ensure the efficiency, reliability, and longevity of these systems. Diesel engines, widely used in various industrial and automotive applications, require thorough analysis to guarantee optimal performance and compliance with emission standards.

There are two main types of engines based on the ignition method:

- **Otto Cycle:** Spark ignition.
- **Diesel Cycle:** Compression ignition.

The testing process allows for evaluating engine behavior under different operating conditions, while the diagnosis identifies potential faults, wear, or inefficiencies that could affect its operation. The importance of these procedures lies in the ability to anticipate problems before they become serious failures, which not only reduces maintenance costs but also improves the safety and overall performance of the engine.

Through detailed diagnostics, precise adjustments can be made to optimize fuel consumption, minimize pollutant emissions, and extend the engine's life, ensuring its performance in demanding environments.

The Comprehensive Diesel Test and Diagnostic Bench for Internal Combustion Engines, "TBM/D", designed by EDIBON, is used to evaluate diesel engine performance. Tests are conducted following specific standards to obtain the engine's characteristic curves. The primary goal is to determine the engine's performance under controlled conditions.



Certificate of Approval of the
Quality Management System



European Union Certificate
(total safety)



UL and CSA Regulations
(All our products are manufactured according
to current UL and CSA regulations)



Certificate of Approval of the
Environmental Management System



Worlddidac Association
Certificate of Membership

GENERAL DESCRIPTION

The Comprehensive Diesel Test and Diagnostic Bench for Internal Combustion Engines, "TBM/D", is an advanced unit designed by EDIBON to conduct exhaustive tests and precise diagnostics on diesel engines. Ideal for engineers and technicians, this unit allows for the analysis of engine performance, identification of faults, and optimization of engine operations, ensuring efficiency and reliability in the maintenance and development of automotive systems.

The internal combustion engine is the central component of the test bench and the primary subject of study. Its function is to convert the chemical energy of the fuel into mechanical energy through combustion in the cylinders. This unit enables the analysis of this conversion and the evaluation of combustion efficiency, exhaust gas emissions, and overall engine performance key aspects for optimizing diesel engines.

- The **air intake system** ensures that the engine receives the oxygen necessary for combustion, allowing for monitoring and analysis of air quantity and quality, which are vital for efficient combustion and directly impact power and fuel consumption.
- The **exhaust gas system** expels combustion by-products and reduces noise. The unit's exhaust system is identical to that of a vehicle, allowing for the analysis of its behavior and operation. Additionally, the engine's efficiency can be observed, and the composition of exhaust gases can be analyzed to assess compliance with regulations and environmental impact.
- The **fuel supply system** controls the exact amount of fuel injected into the cylinders, influencing combustion efficiency and engine performance. Through the diagnostic unit, various parameters of the fuel injection system can be evaluated. The Comprehensive Diesel Test and Diagnostic Bench for Internal Combustion Engines, "TBM/D", allows for adjustments and observation of how different fuel quantities affect the engine, optimizing consumption.
- The **cooling system** dissipates the heat generated during combustion to prevent overheating and maintain the engine within a safe temperature range, allowing for monitoring of the system's efficiency and its impact on engine durability.
- The **starting system** includes an electric motor that initiates the first combustion, enabling the study of the starting process. This allows for analysis of how the engine behaves under cold start conditions, which is crucial for evaluating reliability in different environments.

The unit's instrumentation includes sensors that provide real-time data on critical engine variables such as pressure, temperature, speed, and fuel and air quantities. This data is essential for an exhaustive analysis of engine performance and allows for precise adjustments to optimize its operation.

This unit allows for the individual study of each engine system and also offers the capability to conduct comprehensive tests that simulate real operating conditions. These tests are fundamental for evaluating engine behavior under different scenarios, such as overloads and extreme temperatures.

Precise diagnostics are key to the proper functioning of a vehicle. With the Comprehensive Diesel Test and Diagnostic Bench for Internal Combustion Engines, "TBM/D" and by analyzing test data, faults or inefficiencies that are crucial for preventive maintenance can be identified. This allows for intervention before serious breakdowns occur and facilitates real-time adjustments and repairs, improving engine reliability. The diagnostic unit can evaluate engine behavior in various situations and correct errors throughout the vehicle's lifespan.

SPECIFICATIONS

Anodized aluminum frame and panels made of painted steel.

The unit includes wheels to facilitate its mobility.

Main metallic elements made of stainless steel.

Bench composed of the following elements: safety mushroom button, key, USB connector for computer, hood opening, and plug.

Articulated and transparent hood with electric lock for full visualization of the complete system.

High-strength aluminum chassis coated with epoxy paint, supported on 160 mm diameter wheels.

Auxiliary panel composed of all the auxiliary elements found in a vehicle.

Emergency mushroom button, lateral emergency button for engine detection. A safety mushroom button is provided on each side of the unit.

Original vehicle fuel tank.

AdBlue tank located under the unit's structure.

Liquid retention tank in case of leakage or improper handling.

Battery box, includes 12V car battery, battery cut-off relay for unit safety, and battery charger.

Fuse and relay box, main engine fuses, and relays.

Diesel engine with all necessary elements involved in its proper operation: engine, injectors, coils, intake filter, intake manifold, ECU, etc.

Diagnostic system displaying CAN network information on a high-resolution screen.

Cables and accessories, for normal operation.

Manuals: This unit comes with the following manuals: Required services, Assembly and Installation, Commissioning, Safety, Maintenance, and Practices manual.



TBM/D detail

EXERCISES AND PRACTICAL POSSIBILITIES

- 1.- Identification of the combustion engine and each of its parts.
- 2.- Startup of the diesel engine and recording results under different conditions.
- 3.- Procedure and analysis of cold start of the diesel engine.
- 4.- Interpretation of electrical schematics and the systems involved.

REQUIRED SERVICES

- Electrical supply: single-phase 200 VAC – 240 VAC/50 Hz or 110 VAC – 127 VAC/60 Hz.

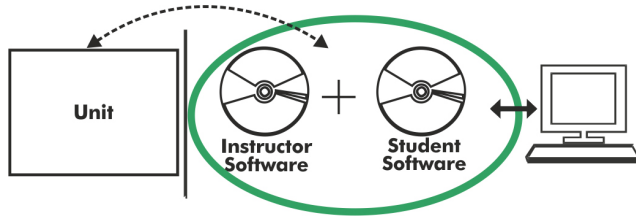
DIMENSIONS AND WEIGHTS

TBM/D:

- Dimensions: 2000 x 1500 x 2400 mm approx.
(78,74 x 59,05 x 94,48 inches approx.).
- Weight: 200 Kg approx.
(440 pounds).

REQUIRED CONSUMABLES (Not included)

- Fuel suitable for the engine.
- Oil suitable for the engine.
- Coolant suitable for the engine.

TBM/D/ICAI. Interactive Computer Aided Instruction Software:

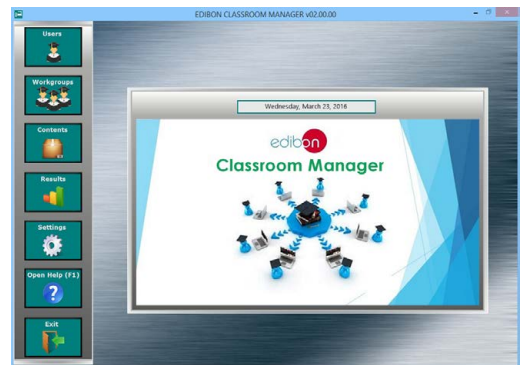
With no physical connection between unit and computer, this complete software package consists of an Instructor Software (EDIBON Classroom Manager -ECM-SOF) totally integrated with the Student Software (EDIBON Student Labsoft -ESL-SOF). Both are interconnected so that the teacher knows at any moment what is the theoretical and practical knowledge of the students.

Instructor Software**- ECM-SOF. EDIBON Classroom Manager (Instructor Software).**

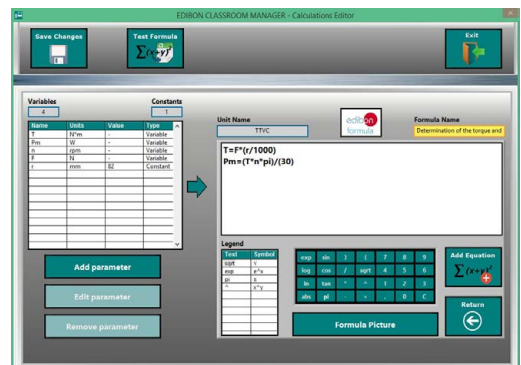
ECM-SOF is the application that allows the Instructor to register students, manage and assign tasks for workgroups, create own content to carry out Practical Exercises, choose one of the evaluation methods to check the Student knowledge and monitor the progression related to the planned tasks for individual students, workgroups, units, etc... so the teacher can know in real time the level of understanding of any student in the classroom.

Innovative features:

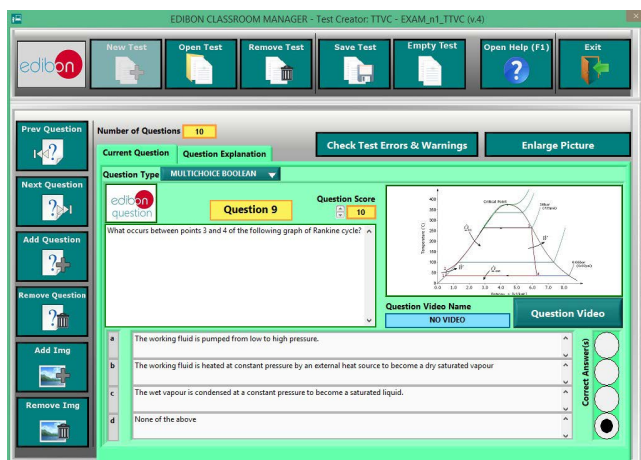
- User Data Base Management.
- Administration and assignment of Workgroup, Task and Training sessions.
- Creation and Integration of Practical Exercises and Multimedia Resources.
- Custom Design of Evaluation Methods.
- Creation and assignment of Formulas & Equations.
- Equation System Solver Engine.
- Updatable Contents.
- Report generation, User Progression Monitoring and Statistics.



ECM-SOF. EDIBON Classroom Manager (Instructor Software) Application Main Screen



ECAL. EDIBON Calculations Program Package - Formula Editor Screen



ETTE. EDIBON Training Test & Exam Program Package - Main Screen with Numeric Result Question



ERS. EDIBON Results & Statistics Program Package - Student Scores Histogram

Optional
Student Software

- ESL-SOF. EDIBON Student Labsoft (Student Software).

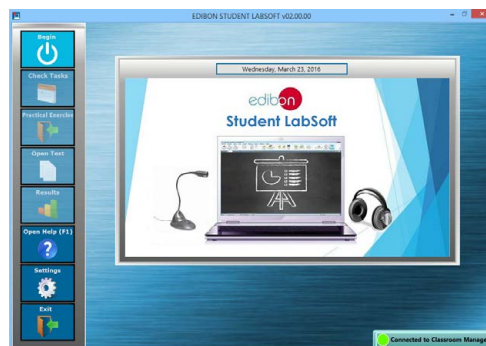
ESL-SOF is the application addressed to the Students that helps them to understand theoretical concepts by means of practical exercises and to prove their knowledge and progression by performing tests and calculations in addition to Multimedia Resources. Default planned tasks and an Open workgroup are provided by EDIBON to allow the students start working from the first session. Reports and statistics are available to know their progression at any time, as well as explanations for every exercise to reinforce the theoretically acquired technical knowledge.

Innovative features:

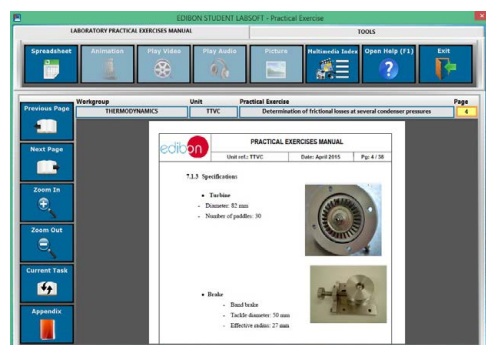
- Student Log-In & Self-Registration.
- Existing Tasks checking & Monitoring.
- Default contents & scheduled tasks available to be used from the first session.
- Practical Exercises accomplishment by following the Manual provided by EDIBON.
- Evaluation Methods to prove your knowledge and progression.
- Test self-correction.
- Calculations computing and plotting.
- Equation System Solver Engine.
- User Monitoring Learning & Printable Reports.
- Multimedia-Supported auxiliary resources.

For more information see ICAI catalogue. Click on the following link:

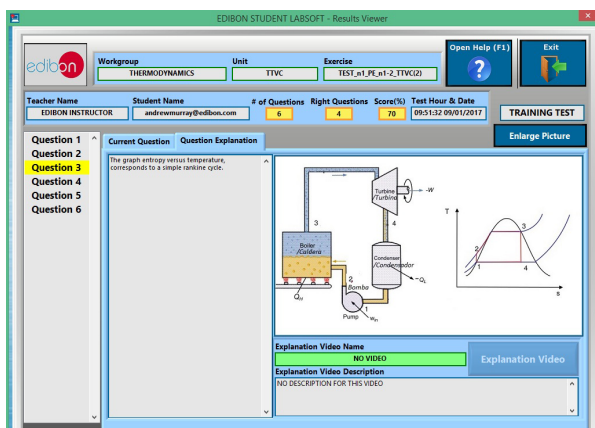
www.edibon.com/en/interactive-computer-aided-instruction-software



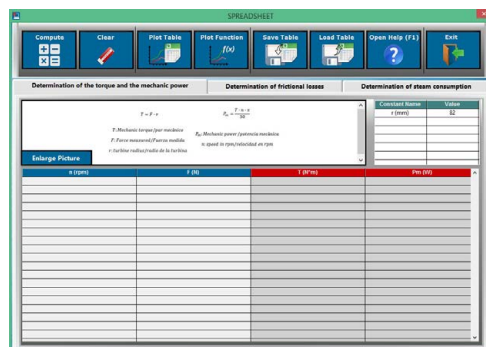
ESL-SOF. EDIBON Student LabSoft (Student Software)
Application Main Screen



EPE. EDIBON Practical Exercise Program Package Main Screen



ERS. EDIBON Results & Statistics Program Package - Question Explanation



ECAL. EDIBON Calculations Program Package Main Screen

* Specifications subject to change without previous notice, due to the convenience of improvement of the product.



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REPRESENTATIVE:

