



INTRODUCTION

Material testing allows determining strength of materials, verifying their properties and establishing their behaviour under external influences. Shape and dimensions of a body, specific weight and density, humidity content, etc. are generally determined with physical tests, whereas strength, elasticity and plasticity, ductility, tenacity and fragility, etc. are determined with mechanical tests.

The hardness test is, together with the tension test, one of the most used in metals selection and quality control. Intrinsically, hardness is a surface condition of the material and it does not represent any fundamental property of the mass.

Hardness test is simple, highly efficient, since it does not destroy the sample, and especially useful to evaluate properties of the different microstructural components of the material.

The Brinell, Vickers and Rockwell Hardness Testing Unit "EBVR" allows to measure and to determine Brinell, Vickers and Rockwell hardness of metallic materials or test pieces.

GENERAL DESCRIPTION

The Brinell, Vickers and Rockwell Hardness Testing Unit, "EBVR", consists of a hardness testing machine that determines the three main types of hardness (Brinell, Vickers and Rockwell). It can be adapted to determine hardness of ferrous materials (steel, casting pieces, etc.), nonferrous materials (aluminum and copper alloys, etc.), test pieces and alloys.

The most common method used to calculate the hardness of a metal is measuring the indentation strength with the aid of a tool of specific geometry. It consists on measuring the imprint generated when exerting a preset load on the test piece for a specific time.

A penetrating ball of specific diameter is used in the Brinell hardness test to press the surface of the test piece with a specific force. The EBVR unit employs balls of 2.5 mm. and 5 mm.

The Vickers method allows to measure the hardness of practically all metallic materials, regardless their state and thickness. It employs a square base pyramid-shaped indenter made of diamond. Such indenter is applied perpendicularly to the surface whose hardness is going to be measured.

The Rockwell method generates a small size imprint during the test. It employs small quenched steel balls or a cone made of diamond for the indentation. The measuring process with the indenter made of diamond is used for hard materials, such as quenched materials.



ISO 9001: Quality Management (for
Design, Manufacturing, Commercialization
and After-sales service)



European Union Certificate
(total safety)



Certificates ISO 14001 and ECO-
Management and Audit Scheme
(environmental management)



"Worlddidac Quality Charter"
and Platinum Member of
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SPECIFICATIONS

Dead weight universal analogical hardness tester. It allows to combine three hardness tests: Brinell, Vickers and Rockwell.

Simple testing cycle through a lever.

Maximum test height: 180 mm.

Maximum depth (from the center): 200 mm.

Test loads.

Brinell: 31.25 – 62.5 – 187.5 Kg (306 – 613 – 1839 N).

Vickers: 30 – 100 Kg (294 – 588 – 980 N).

Rockwell: 60 – 100 – 150 Kg. (588 – 980 – 1471 N).

Hardness reading range:

Brinell: 4 – 450 HB.

Vickers: 14 – 1000 HV30.

Rockwell: 70 – 85 HRA, 20 – 67 HRC and 30 – 100 HRB.

Imprint measurement:

Brinell: imprint reading with microscope.

Vickers: imprint reading with microscope.

Rockwell: optical reading.

Gage block:

Brinell: 200 +/- 50 HB 2.5/187.5/30.

Vickers: 450 +/- 50 HV 30.

Rockwell: 55 – 65 HRC, 25 – 95 HRC and 75 – 95 HRB.

Type of indenter:

Brinell test: balls of 2.5 and 5 mm.

Vickers test: cone made of diamond 136°.

Rockwell test: cone made of diamond 120° and ball of 1/16" (1.588 mm).

Large testing platform. Medium-size testing platform. V-shaped testing platform. Sliding platform. V-shaped platform. Pyramidal platform.

Portable microscope for imprints reading:

Micrometric lens of 15 X.

Lenses (2.5 X) and (5 X).

6 Lamps for measurements.

Cables and accessories, for normal operation.

Manuals: This unit is supplied with the following manuals: Required Services, Assembly and Installation, Start-up, Safety, Maintenance and Practice Manuals.

EXERCISES AND PRACTICAL POSSIBILITIES

- 1.- Familiarization with the use of instrumentation to perform hardness tests.
- 2.- Study and familiarization with the Brinell, Vickers and Rockwell hardness testing unit.
- 3.- Brinell hardness measurement on different materials.
- 4.- Vickers hardness measurement on different materials.
- 5.- Rockwell hardness measurement on different materials.
- 6.- Observation of the behaviour of diverse materials under different loads.
- 7.- Knowledge of the types of standard test pieces for these types of tests.
- 8.- Knowledge of the types of standard indenters for these types of tests.

REQUIRED SERVICES

-Electrical supply: single-phase 220 V/50 Hz or 110 V/60 Hz.

DIMENSIONS AND WEIGHTS

EBVR:

Unit:

-Dimensions: 300 x 560 x 800 mm approx.

(11.81 x 22.04 x 31.49 inches approx.)

-Weight: 100 Kg approx.

(220.46 pounds approx.)

2 Cases for elements:

-Dimensions (each one):

380 x 330 x 150 mm approx.

(14.96 x 12.99 x 5.9 inches approx.)

EBVR/ICAI. Interactive Computer Aided Instruction Software System:



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.

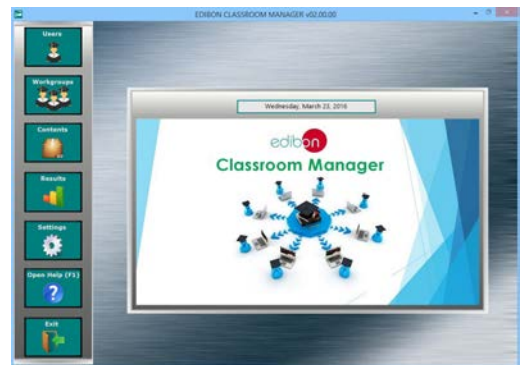
Instructor Software

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

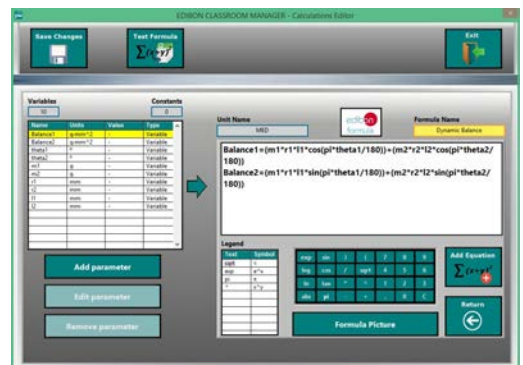
ECM-SOF is the application that allows the Instructor to register students, manage and assign tasks for workgroups, create own content to carry out Practical Exercises, choose one of the evaluation methods to check the Student knowledge and monitor the progression related to the planned tasks for individual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

Innovative features:

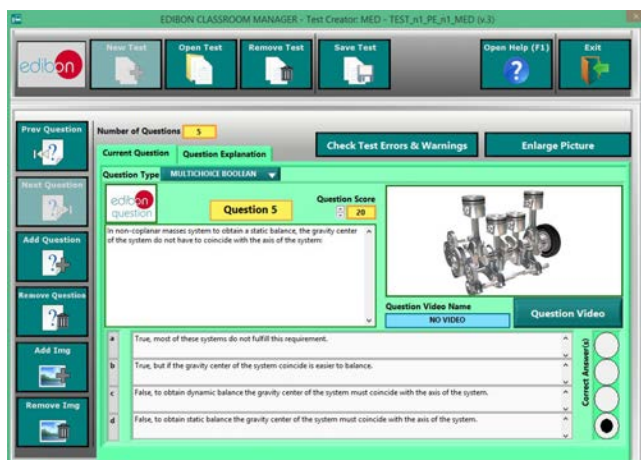
- User Data Base Management.
- Administration and assignment of Workgroup, Task and Training sessions.
- Creation and Integration of Practical Exercises and Multimedia Resources.
- Custom Design of Evaluation Methods.
- Creation and assignment of Formulas & Equations.
- Equation System Solver Engine.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

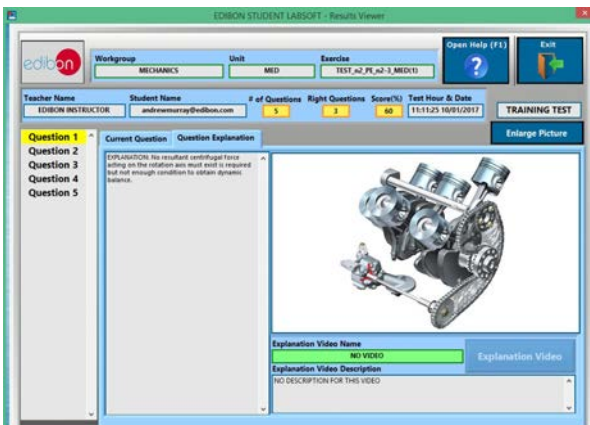
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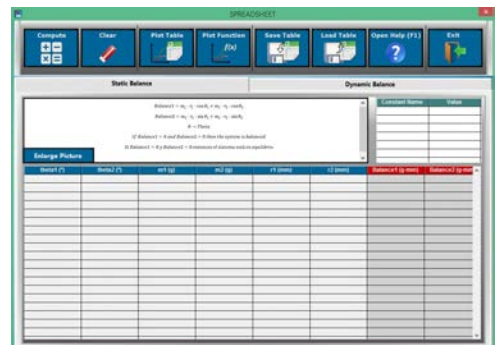
ESL-SOF. EDIBON Student LabSoft (Student Software) Application Main Screen



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:

