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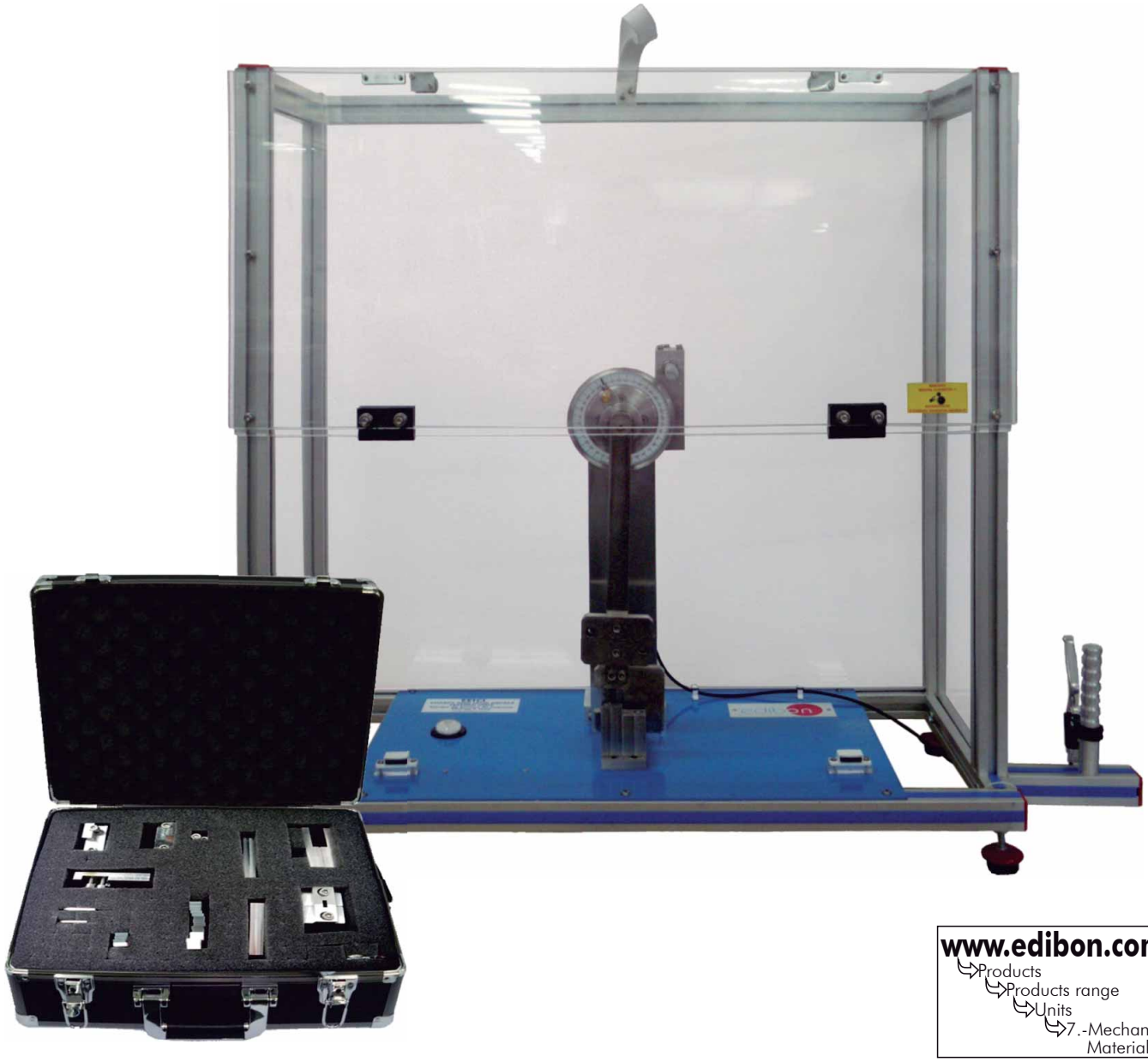
Technical Teaching Equipment

Charpy and Izod Impact Testing Unit

EEICI



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INTRODUCTION

The EEICI unit is designed for carrying out resilience or impact tests on plastic materials. The resilience test is a type of destructive test that gives us the toughness measure of a material and indirectly its ductility.

A material's toughness can be defined as the capacity for absorbing the energy in the plastic area prior to its rupture in an impact test.

There are several type of impact or resilience tests. The most common ones are those performed with a pendulum.

The resilience test involves leaving a pendulum of *P* weight fall freely from an initial height *H* against a specimen placed in the lower part. The pendulum breaks the specimen and afterwards reaches a height *h*. We can compare the initial potential energy from *H* to the final potential energy at *h* to see how much energy was absorbed by the specimen.

Depending on the way the specimen is supported, there are impact tests that use the Charpy method, in which it is supported on two ends and impact tests that use the Izod method, in which the one of the specimen's ends is fitted.

ISO 9000: Quality Management
(for Design, Manufacturing, Commercialization and After-sales service)

European Union Certificate
(total safety)

Certificates ISO 14000 and
ECO-Management and Audit Scheme
(environmental management)

Worlddidac Quality Charter Certificate and
Worlddidac Member

GENERAL DESCRIPTION

The EEICI unit is designed for testing plastic specimens. Therefore, it is a type of pendulum that reaches potential energy thresholds that are adequate for breaking these plastic specimens. The specimens and the tests are developed according to the following standards:

- Charpy method: Standard ISO 179.
- Izod method: Standard ISO 180.

The unit consists of the following elements:

- Pendulum: It is supported by bearings and is 330 mm long. On one of its ends we can mount the appropriate hammer for each test, be it Charpy or Izod.
- Hammers: Depending on the test we are carrying out, we will use one type of hammer or another. The Charpy Hammer has the shape of a "C" and it is used for impact tests on specimens that are supported on both ends horizontally. The Izod Hammer is used to impact on specimens that are fitted vertically.
- Charpy clamp: These are the two supports that we will assemble on the base in order to place the specimen, simply support on both ends.
- Izod clamp: Also consisting of two supports that we will assemble in the centre of the base. It consists of two parts and its assembly has screws which hold the specimens vertically.
- Allen keys in order to tighten the specimens into the clamps.
- A graduated disc with a pointer which will mark the energy used to break the specimen.
- The specimens are made of different plastic materials, according to the standards mentioned previously. They have a notch in order to make their breaking easier. They are made of PVC, PTFE and PMMA.
- Support system for the pendulum at the starting point of the test.

SPECIFICATIONS

The EEICI unit for impact testing with the Charpy and the Izod pendulums is mounted on an aluminum structure that provides the device great rigidity. The aluminium structure is covered by a painted steel panel.

The unit consists of the following elements:

Pendulum: It is supported by bearings and has an length of 330 mm. On one of its ends we can mount the appropriate hammer for each test, be it Charpy or Izod.

Initial angle: 150°.

Charpy potential energy: 5 J, 7.5 J and 10 J.

Izod potential energy: 8.5 J.

Hammers:

The Charpy Hammer has the shape of a "C" and it is used for impact tests on specimens that are supported on both ends.

The Izod Hammer is used to impact on specimens that are fitted vertically.

Charpy clamp. It is composed with the accessories needed for supporting the specimens, according to Standard ISO 179.

Izod clamp. It is composed with the accessories needed for supporting the specimens, according to Standard ISO 180.

Allen keys in order to tighten the specimens into the clamps.

A graduated disc with a pointer will mark the energy used to break the specimen.

Specimens made in different plastic materials:

They have a notch in order to make their breaking easier.

They are made of PVC, PTFE and PMMA.

Their dimensions are 80 mm length and its cross section is 10 mm x 4 mm.

Support system for the pendulum at the starting point of the test.

Protection transparent cover that allows the safe viewing of the experiments by the student.

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

EXERCISES AND PRACTICAL POSSIBILITIES

Some Practical Possibilities of the Unit:

1.- Experimental determination of the energy needed in order to break specimens of different materials using the Charpy method.

2.- Experimental determination of the energy necessary to break specimens of different materials using the Izod method.

3.- Experimental determination of the pendulum's friction losses.

DIMENSIONS & WEIGHT

-Dimensions: 1000 x 600 x 600 mm. approx. (39.37 x 23.62 x 23.62 inches approx.).
-Weight: 70 Kg. approx. (154.32 pounds approx.).

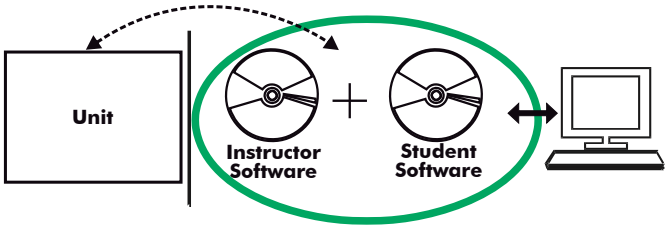
SPARE PARTS

EEICI-SP. Spare Specimens Set:

The set includes:

- 2 Specimens for Charpy Test (PVC).
- 2 Specimens for Charpy Test (PMMA).
- 2 Specimens for Charpy Test (PTFE).
- 2 Specimens for Izod Test (PVC).
- 2 Specimens for Izod Test (PMMA).
- 2 Specimens for Izod Test (PTFE).

EEICI/CAI. Computer Aided Instruction Software System:



With no physical connection between unit and computer (PC), **this complete software package consists of an Instructor Software (INS/SOF) totally integrated with the Student Software (EEICI/SOF).** Both are interconnected so that the teacher knows at any moment what is the theoretical and practical knowledge of the students.

INS/SOF. Classroom Management Software (Instructor Software):

The Instructor can:

- Organize Students by Classes and Groups.
- Create easily new entries or delete them.
- Create data bases with student information.
- Analyze results and make statistical comparisons.
- Generate and print reports.
- Detect student's progress and difficulties.

...and many other facilities.

This software, working in network configuration, allows controlling all the students in the classroom.

Example of software screens

Instructor Software

EEICI/SOF. Computer Aided Instruction Software (Student Software).

It explains how to use the unit, run the experiments and what to do at any moment.

- This software contains:

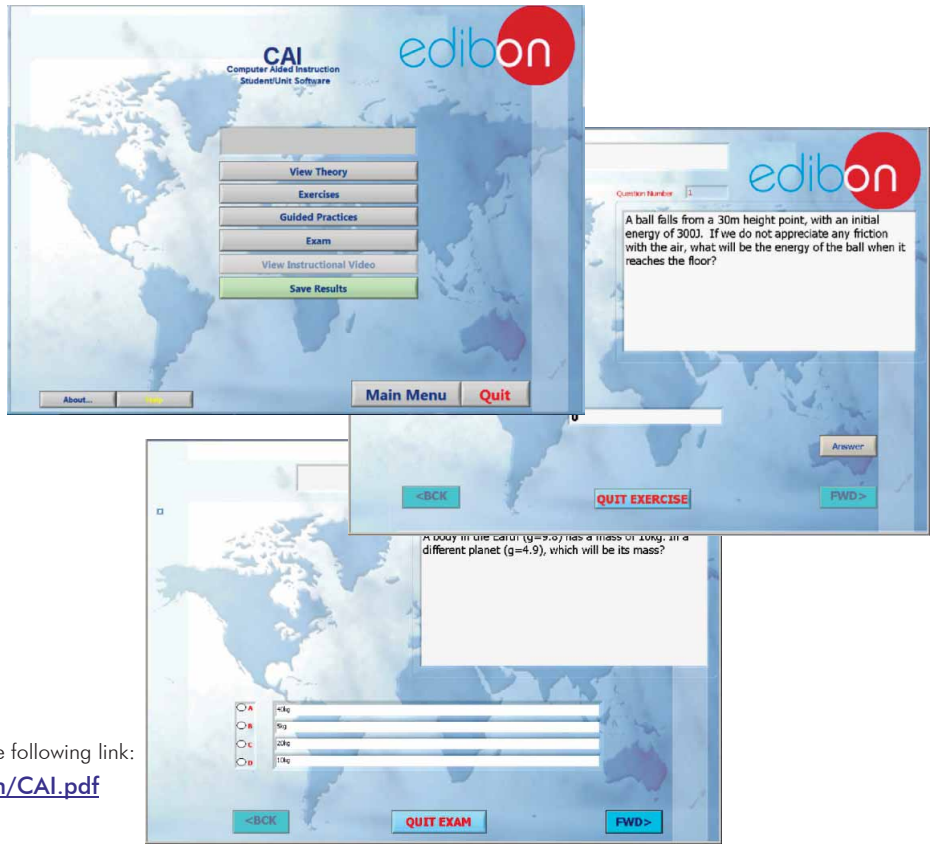
Theory: gives the student the theoretical background for a total understanding of the studied subject.

Exercises: divided by thematic areas and chapters to check out that the theory has been understood.

Guided Practices: presents several practices to be done with the unit, showing how to perform the exercises and practices.

Exams: set of questions to test the obtained knowledge.

Student Software



For more information see **CAI** catalogue. Click on the following link:
www.edibon.com/products/catalogues/en/CAI.pdf

EEICI/CAL. Computer Aided Learning Software (Results Calculation and Analysis):

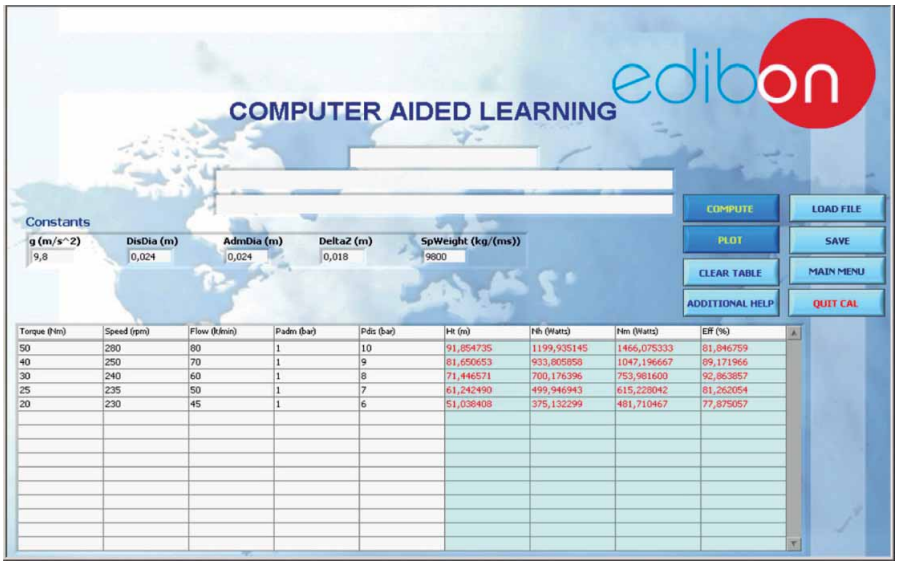
This Computer Aided Learning Software (Results Calculation and Analysis) "CAL" is a Windows based software, simple and very easy to use, specifically developed by EDIBON.

CAL is a class assistant that helps in doing the necessary calculations to extract the right conclusions from data obtained during the experimental practices. With a single click, CAL computes the value of all the variables involved and performs the calculations.

Also, CAL allows to plot and print the results. Within the plotting options, any variable can be represented against any other.

Available different plotting displays.

It has a wide range of information, such as constant values, unit conversion factors and integral and derivative tables.



On a table, we introduce data obtained during the development of the exercise.

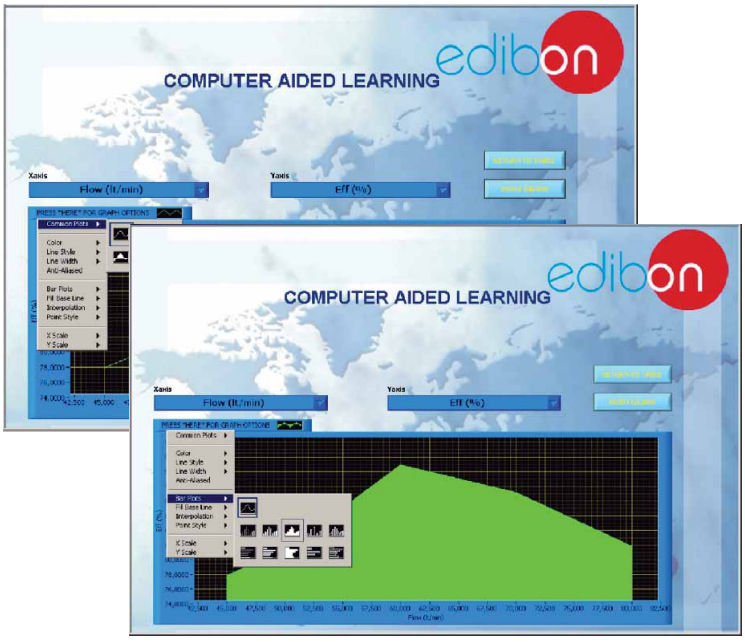
Above this table, it is shown "Constants" theoretically involved with the field of study. The values of these "Constants" may be modified to our convenience, assigning the appropriate values.

Simply, by clicking on "COMPUTE", CAL performs the calculations of the desired variables.

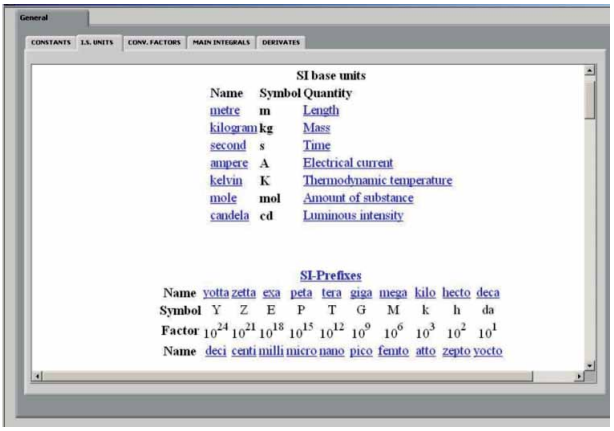
We can save and print the data of the experiment or calculations.

Also we can load any data file saved previously.

With the calculated variables, CAL gives the option of plotting the results. It is possible to represent any variable against any other. It has the option of representing the graph with different layouts. Screens below give an example of the multiple choices.



CAL has a wide range of help information. By clicking the button "ADDITIONAL HELP" opens a window where we have information about typical Constants, International System Units, Conversion Factors, and Table of Main Integrals and Derivatives (General), and there is other specific help for the particular unit.



For more information see **CAL** catalogue. Click on the following link:
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✱Specifications subject to change without previous notice, due to the convenience of improvements of the product.

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