Engineering and Technical Teaching Equipment

Falling Sphere Viscometer and Drag Coefficient

HVB

www.edibon.com
PRODUCTS
80.- FLUID MECHANICS

GENERAL DESCRIPTION

The Falling Sphere Viscosimeter and Drag Coefficient Unit, "HVB", is used to determine dynamic or kinematic viscosities of fluids and the relationship between the drag coefficients of falling particles and their Reynolds number value. As a material property, viscosity is extremely important for technical applications.

The unit consists of two precision transparent tubes fixed onto a frame in which a ball is allowed to drop down through different liquids. Both tubes can be filled with liquids of different viscosity. Thus, it is possible to compare the both liquids directly.

The unit is illuminated from behind with two fluorescent lamps to facilitate the visualization of the falling of the balls.

The ball is guided down by a guide to aid the introduction of particles at the top of the tubes with the minimum disturbance to the liquid. The unit includes several guides to facilitate the introduction of smaller balls.

During the exercises, students shall measure the falling rate of the balls by timing their passage between two marks on the walls of the tube.

Balls can be removed from the bottom of the tubes through two valves. Thus, the ball can be removed from the tube without a large loss of liquid.

Kinematic viscosity can be deduced by measuring the falling speed of a ball in a vertical tube filled with the fluid under study. During the uniform rectilinear motion phase, the forces which apply to the sphere, the gravity, the pressure of Archimedes and the force of the trail related to viscous friction are in balance.

The design of the unit is such that it is suitable both for practical trainee experiments in the fields of physics or engineering and for demonstration in the classroom.

The unit is supplied with a set of balls of different size, a stopwatch and two beakers.

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 Worlddidac

SPECIFICATIONS

Unit mounted on an anodized aluminium structure with panels in painted steel.

Two transparent measuring cylinders:

Internal diameter: 114 mm.

External diameter: 120 mm.

Length: 1.3 m.

Both cylinders are marked longitudinally every 50 cm, so that the distance the ball travels after being thrown inside can be read.

Two light sources placed between the tubes for ease of viewing. Power: 58 W.

Two guides to aid the introduction of particles at the top of the tubes with the minimum disturbance to the liquid.

Six couplings for the guides to make the introduction of smaller balls possible (5 mm, 10 mm and 15 mm).

Two ball valves and two gate valves to aid the removal of balls from the bottom of the tubes, without a large loss of liquid.

Sets of balls of different sizes:

Ball 1 is made of stainless steel, diameter = 5 mm.

Ball 2 is made of stainless steel, diameter = 10 mm.

Ball 3 is made of stainless steel, diameter = 15 mm.

Ball 4 is made of stainless steel, diameter = 20 mm.

Ball 5 is made of stainless steel, diameter = 25 mm.

A stopwatch.

Two plastic beakers with a capacity of 0.50 l. each one.

Cables and accessories, for normal operation.

Manuals:

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

EXERCISES AND PRACTICAL POSSIBILITIES

1.- Determination of the Reynolds number.

2.- Determination of the dynamic and kinematic viscosity of a fluid.

3.- Drag coefficient of various particles of spheres.

4.- Measurements of the spheres resistance coefficients vs Reynolds number.

5.- Measurement of the terminal velocities of the spheres.

REQUIRED SERVICES

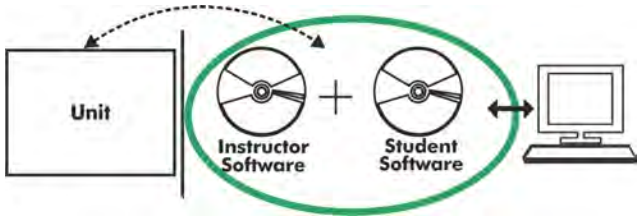
- Electrical supply: 220V/50Hz or 110V/60Hz.
- Fluids with different viscosities are required.

DIMENSIONS AND WEIGHTS

HVB:

- Dimensions: 500 x 670 x 1800 mm approx.
  (19.68 x 26.38 x 70.87 inches approx.).
- Weight: 40 Kg approx.
  (88.18 pounds approx.).

HVB/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.

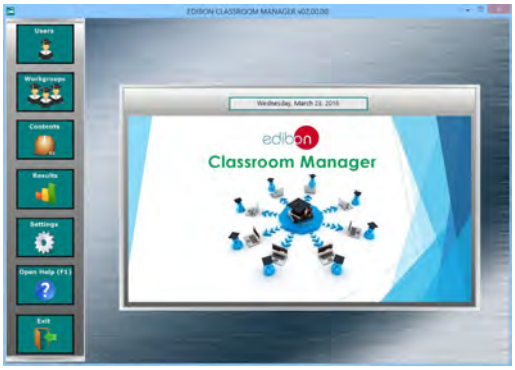
Instructor Software

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

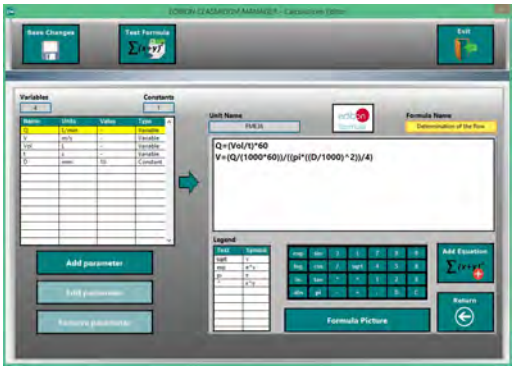
ECM-SOF is the application that allows the Instructor to register students, manage and assign tasks for workgroups, create own content to carry out Practical Exercises, choose one of the evaluation methods to check the Student knowledge and monitor the progression related to the planned tasks for individual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

Innovative features:

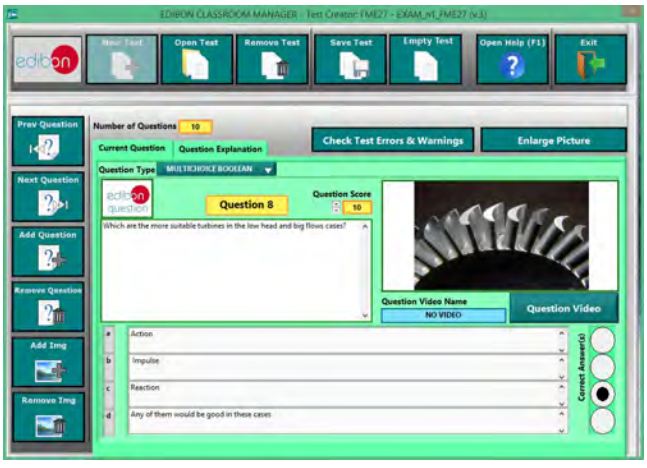
- **User Data Base Management.**
- **Administration and assignment of Workgroup, Task and Training sessions.**
- **Creation and Integration of Practical Exercises and Multimedia Resources.**
- **Custom Design of Evaluation Methods.**
- **Creation and assignment of Formulas & Equations.**
- **Equation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

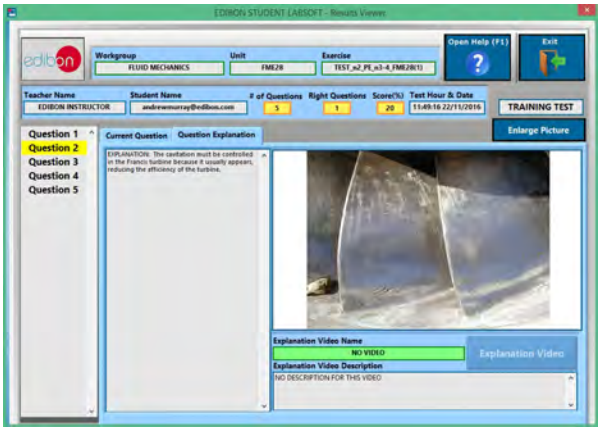
- **Student Log-In & Self-Registration.**
- **Existing Tasks checking & Monitoring.**
- **Default contents & scheduled tasks available to be used from the first session.**
- **Practical Exercises accomplishment by following the Manual provided by EDIBON.**
- **Evaluation Methods to prove your knowledge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

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

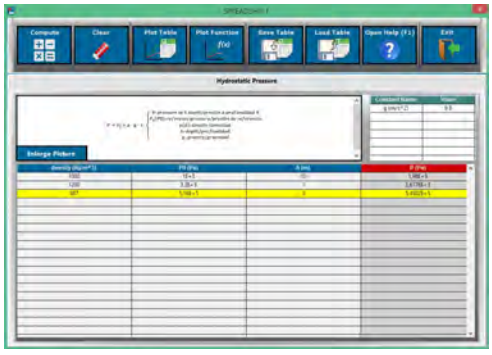
EPE. EDIBON Practical Exercise Program Package Main Screen

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

www.edibon.com/en/files/expansion/ICAI/catalog



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: