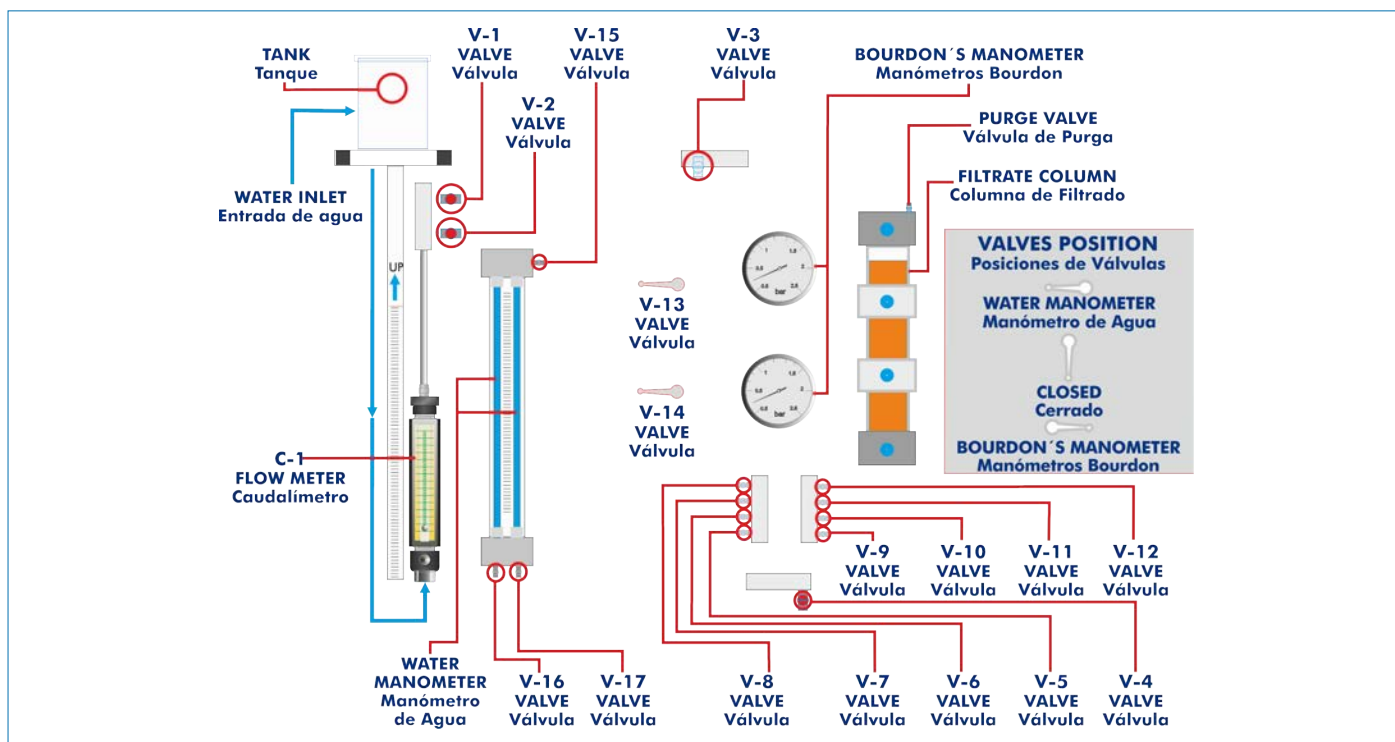




PROCESS DIAGRAM AND UNIT ELEMENTS ALLOCATION



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

INTRODUCTION

Permeability is the ability of a material to allow a fluid to pass through it without altering its internal structure. The liquid can pass through the material at a greater or lower velocity according to its pressure and density, and also to the porosity of the permeable material.

Permeability is one of the most important properties for engineers in the development of geotechnical engineering projects.

The Permeability/Fluidisation Studies Unit, "PEFP", has been designed by EDIBON to measure and understand the flow characteristics through a bed of particles, as well as to prove Darcy's law and examine Kozeny equation.

GENERAL DESCRIPTION

The Permeability/Fluidisation Studies Unit, "PEFP", allows to observe the behaviour of liquid fluidisation in a granular bed.

The main element is a permeability meter. It is a transparent cylinder that supports the soil sample to be studied. Water will flow downward to study permeability or upward to study fluidization.

The cylinder has four pressure taps: one at the top and one at the bottom to measure the pressure drop through the bed and two along the cylinder to measure the total pressure at those specific points of the sample.

Water is supplied to the permeability meter by a constant pressure supply device. It is a transparent tank with an overflow located above the permeability meter. The height of this tank can be changed, thus modifying the pressure.

Two metal filtering discs are placed between the floor and the porous element at the top and bottom of the cylinder. These discs act as filters and distribute the flow over the cross-sectional area of the sample.

The unit has two manometers: a tube manometer used to measure low pressures and a Bourdon manometer used to measure high pressures.

SPECIFICATIONS

Bench-top unit.

Anodized aluminum frame and panels made of painted steel.

Main metallic elements made of stainless steel.

Diagram in the front panel with distribution of the elements similar to the real one.

Unit to verify the Darcy's Law, to examine the Kozeny's equation and to observe liquid fluidisation behaviour of a granular bed.

Permeameter: transparent acrylic cylinder of 50 mm diameter, 500 mm length.

Two filter metallic disks.

Four pressure taps located along the vertical axis of the cylinder.

Tubes manometer of 500 mm length.

Two manometers, Bourdon type, range: 0 – 1000 mm.c.a.

Constant head supply device: max. height variation: 500 mm.

Flowmeter, range: 0.2 – 2 l/min.

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.



PEFP detail

EXERCISES AND PRACTICAL POSSIBILITIES

- 1.- Pressure drop measurements and correlations for flow through packed beds.
- 2.- Calculation of the density of each sample.
- 3.- Calculation of the relative density of a mixed sample.
- 4.- Study and verification of the Kozeny's equation.
- 5.- Calculation the void ratio.
- 6.- Determination of the permeability coefficient (Darcy's Law).
- 7.- Observation of a liquid fluidised bed.
- 8.- Characteristic of a liquid fluidised bed.
- 9.- Measurement of permeability of selected solids.

REQUIRED SERVICES

- Water supply (2 l/min max.) and drain.

DIMENSIONS AND WEIGHTS

PEFP:

- Dimensions: 800 x 400 x 1100 mm approx.
(31.49 x 15.74 x 43.31 inches approx.)
- Weight: 30 kg approx.
(66 pounds approx.)

REQUIRED CONSUMABLES (Not included)

- Sand of different diameters.

RECOMMENDED ELEMENTS (Not included)

- Thermometer.
- Balance.
- Alternative bed materials (Ballotini, anthracite, gravel, mud, clay, etc.)
- Chronometer.

PEFP/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.

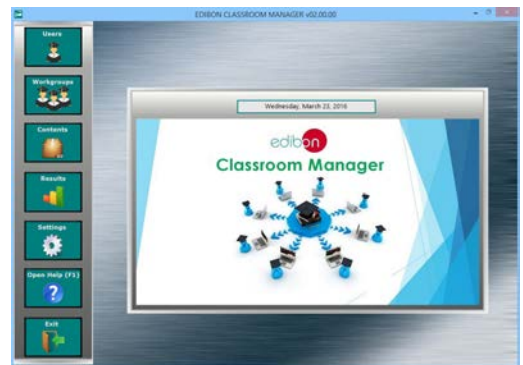
Instructor Software

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

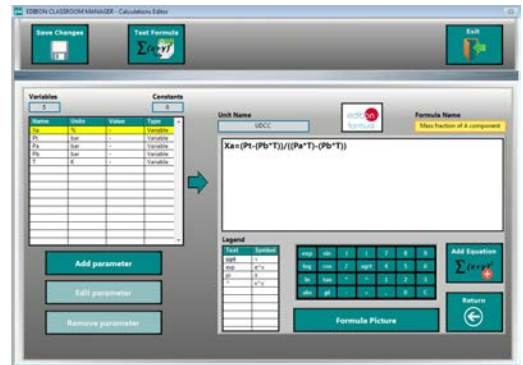
ECM-SOF is the application that allows the Instructor to register students, manage and assign tasks for workgroups, create own content to carry out Practical Exercises, choose one of the evaluation methods to check the Student knowledge and monitor the progression related to the planned tasks for individual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

Innovative features:

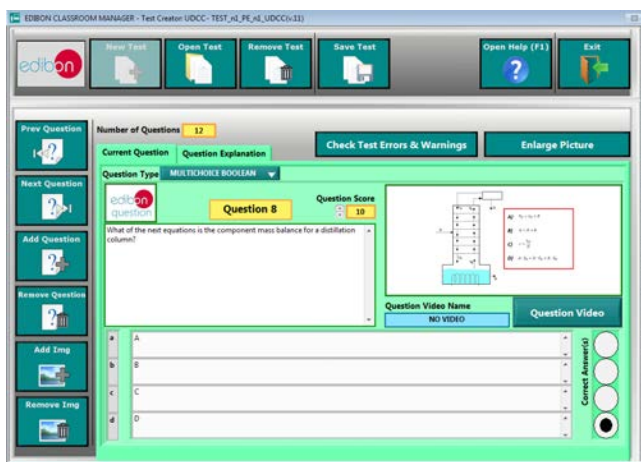
- User Data Base Management.
- Administration and assignment of Workgroup, Task and Training sessions.
- Creation and Integration of Practical Exercises and Multimedia Resources.
- Custom Design of Evaluation Methods.
- Creation and assignment of Formulas & Equations.
- Equation System Solver Engine.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

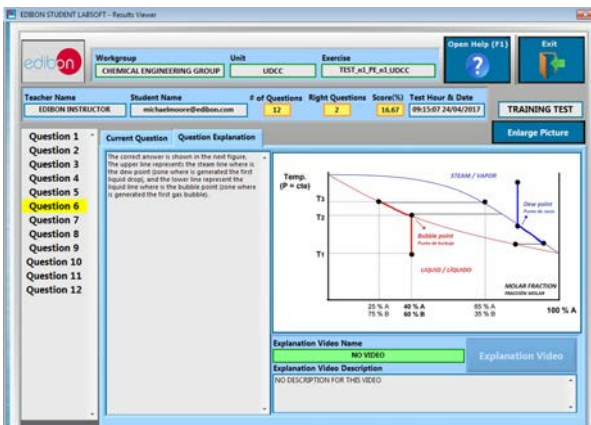
www.edibon.com/en/files/expansion/ICAI/catalog



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

	P1 (bar)	P2 (bar)	T (°C)	Molar fraction
1	10	10	10	0.001
2	10	10	10	0.002
3	10	10	10	0.003
4	10	10	10	0.004
5	10	10	10	0.005
6	10	10	10	0.006
7	10	10	10	0.007
8	10	10	10	0.008
9	10	10	10	0.009
10	10	10	10	0.010

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:

