Drainage and Seepage Tank

PDFD

Technical Teaching Equipment

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GENERAL DESCRIPTION

This unit has been designed for the practical demonstration, visualization and experimental study of the flow through permeable media and flows in subsoil.

The unit basically consist of a tank (soils container) to contain the sand, lower water tanks, a pump for the water flow, pressure meters, a dye injection system with dye injection needles.

The soils container consists on a rectangular tank, with back side in aluminium and front side in methacrylate to see the flow lines. It contains the wet sand which must be collected or sampled by the student.

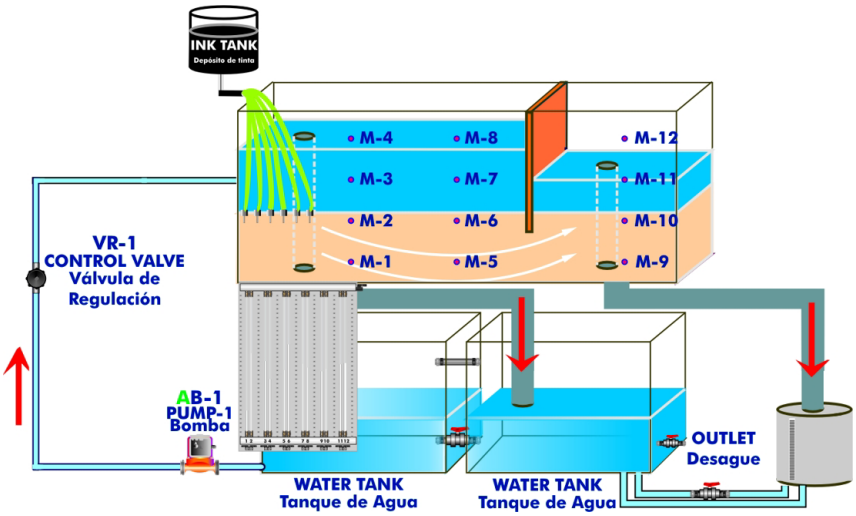
The sand distribution in the tank must be according to the experiment configuration which we want to carry out. For it, there are overflow pipes to be able to put them at different heights, and going up and down the tubes.

The outlet tubes of the overflow pipes make easier the water falling to the tank which has a level switch and a key in order to the lower water tanks go out. The water flow can be measured.

A set of typical models is included: a sheet pile wall, 2 mesh gates and a mobile accessory for pressure measurement, for pressure fall measurements tests, phreatic layer tests, earth dam, etc.

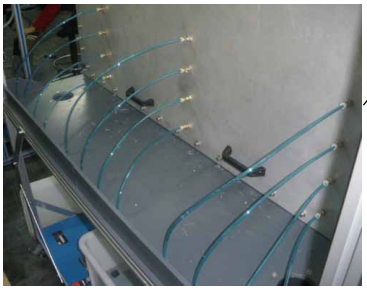
To check the flow lines, there is a dye injection system. This system has a dye vessel and injection needles through where the liquid flows and which are inserted in the sand in the tank, close to the methacrylate side for the flow visualization lines.

PROCESS DIAGRAM AND UNIT ELEMENTS ALLOCATION

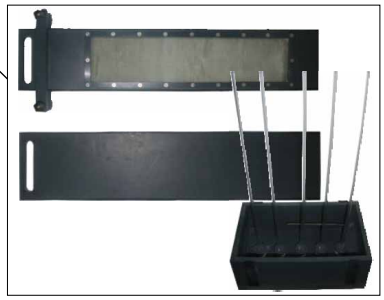


Detail of the dye injection system

Detail of the flow lines



Detail of the back side
(pressure tappings)



Set of typical models

SPECIFICATIONS

Mobile bench.
Anodized aluminium structure and panels in painted steel.
Main metallic elements in stainless steel.
Diagram in the front panel with similar distribution to the elements in the real unit.
Rectangular tank (soils container), with front side in methacrylate and back side in aluminium, to contain the sand. (Sand not included).
2 Overflow pipes in the tank.
12 Pressure tappings joined to a manometric tubes panel.
Feed water tank (capacity: 75 litres).
Water pump: 0.37 KW, 30 - 80 l./min. at 20.1-12.8 m.w.c.
Control valve to regulate the water flow.
Water collection tank (capacity: 75 litres). This tank is connected to the feed water tank. It includes a system to avoid the passing of sediment to the previous one.
Samples collection tank. It includes a level sensor and a valve to control the emptying process.
Dye injection system: with dye vessel, with 8 dye injection needles and regulation valve.
Set of typical models:
- 1 Sheet pile wall.
- 2 Mesh gate.
- 1 Mobile accessory for pressure measurement.

The unit incorporates wheels for its mobility.
Cables and Accessories, for normal operation.
Manuals:

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

EXERCISES AND PRACTICAL POSSIBILITIES

Some Practical Possibilities of the Unit:

1.- Flow net construction.

2.- Flow line visualisation.

3.- Verification of Darcy´s Law.

4.- Comparison of experimental results with analytical solutions.

5.- To determine seepage rates.

6.- Seepage through an earth dam.

7.- Seepage underneath a sheet pile wall.

8.- Control of seepage through permeable soils by sub-soil drainage.

9.- To reduce uplift pressure and lateral thrust by drainage.

10.- Distribution of uplift pressure on hydraulic structures.

11.- Behaviour and formation of "quicksands".

12.- To drain an excavation site using wells.

13.- Stability of an earth dam.

14.- Comparison of permeability according to the grain size.

15.- Sheet pile wall:

Study of the soil permeability.

Flow lines visualization.

Calculation of the equipotential lines.

Pressures distribution.

16.- Permeability of the phreatic layer:

Study of the soil permeability.

Flow lines visualization.

Calculation of the equipotential lines.

Measurement of the infiltration speed.

Verification of the Law of Darcy.

17.- Flow through an earth dam:

Study of the soil permeability.

Flow lines visualization.

Calculation of the equipotential lines.

Pressures distribution.

Effects of the layer inclination.

REQUIRED SERVICES

- Electrical supply: single-phase, 220V./50Hz or 110V./60Hz.
- Water supply and drainage.
- Sand. (For filling of the soils container).

DIMENSIONS & WEIGHT

-Dimensions: 1500 x 700 x 2000 mm. approx.

-Weight: 200 Kg. approx.

AVAILABLE VERSIONS

Offered in this catalogue:

-PDFD. Drainage and Seepage Tank.

Offered in other catalogue:

-PDFDC. Computer Controlled Drainage and Seepage Tank.

✱ Specifications subject to change without previous notice, due to the convenience of improvements of the product.

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