

## Triaxial automated systems

### Pressure ranges:

0 - 1MPa (0-10 bar)  
 0 - 2MPa (0-20 bar)  
 0 - 3MPa (0-30 bar)  
 0 - 4MPa (0-40 bar)  
 0 - 5MPa (0-50 bar)

**Volume capacity:** 230cc

**Interface:** Touchscreen / USB connection  
**(other pressure range - Consult us)**

**Loads Frames:** 50kN, 100kN, 200kN

### Triaxial Cells:

1.700kPa to 3.000 kPa

### Diameters:

38mm to 150mm

**(other diameters / pressure ranges - Consult us)**

**Triaxial Automated System of Proeti is a triaxial test based on one or more load frames and two or more pressure/volume maintainers that may be configured according to the customer specification and budget**

Using our range of frames, triaxial chambers, pressure maintainers and our software EDS, the user can configure it in order to test soils in commercial laboratories or for rocks testing in research laboratories. EDS software (with specific pack of test) and Soilmatic systems can also make advanced test controlled by computer. The system allows to add load frames from 50KN up to 250KN, and pressure maintainers from 500KPa to 5000 kPa.

### What the system is used for?

Automated Triaxial test Soilmatic of Proeti complies with international Standards of testing and it adapts to plans of accreditation of laboratories.

The user select the type of test from a menu UU, TCU, TCD, triaxial consolidation, triaxial saturation, etc and later set the parameters (cell pressure, back pressure, test velocity, etc.), besides stop criteria. The test makes itself automatically, even without manual intervention, and saving the data in a file.

EDS software directly controls the cell and back pressure and test velocity.

Besides saving the parameters in the computer hard disk, the software also acquires measurements of axial deformation, axial force, interstitial pressure and volume change. It is also possible add to the configuration another sensor of measurement with its own data acquisition.

The software allows to display, in real time, all sensors that are taking part in the test.

### Technical specifications:

- Test fully controlled by computer, not only data acquisition
- It is possible to carry out several tests at the same time, controlled by a single computer
- Windows-based Software EDS, for control test and data processing.
- Independent cell pressure and back pressure
- Calibration of measure sensors installed in EDS software
- It is possible to carry out triaxial soil tests according to CEN ISO/TS 17892 standard series
- Flexible software that allows both devices and tests upgrades

### S0220/SM2 Automated Triaxial Testing System

#### Pressure ranges:

- 0 - 1MPa (0-10 bar)
- 0 - 2MPa (0-20 bar)
- 0 - 3MPa (0-30 bar)
- 0 - 4MPa (0-40 bar)
- 0 - 5MPa (0-50 bar)

**Volume capacity:** 230cc

**Interface:** Touchscreen / USB connection  
(other pressure range - Consult us)

#### Force ranges:

50kN, 100kN, 200kN

#### Triaxial Cells:

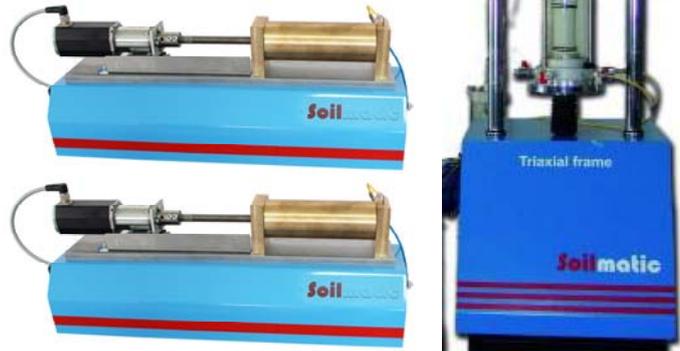
1.700kPa to 3.000 kPa

#### Diameters:

38mm to 150mm

(other diameters - Consult us)

(other pressure ranges - Consult us)



#### Fully Automated Two Pressure Triaxial System

All in one two pressure automated system for any kind of triaxial tests (TUU, TCU and TCD). It makes also possible to automatically perform permeability, consolidation and saturation tests.

The standard model has two pressure / volume maintainers that can be configured and controlled in a fully automated and independent way.

You just have to configure the test with the desired parameters and the software will automatically proceed to saturate the sample. Once the sample is saturated, EDS Software will stop the system and inform you that the saturation process has finished. It will display sensor readings in graphs and calculate "B" coefficient in real time. Consolidation as well as UU, CD and CU triaxial tests are fully automated. Once consolidation is completed, you will be able to use the software to calculate the appropriate breaking velocity for the material that has been consolidated.

Pressure and volume maintainers will automatically keep the pressure value fixed during the test.

All readings are graphed in real time during the test and stored in a database in the PC for later processing. If desired, you will be able to apply corrections related to membrane thickness, paper drains, etc.

#### Pressure Maintainers.

250cc Capacity.

10, 20, 30, 40 and 50 bar Models.

Entirely made of bronze.

Each maintainer has a sensor that informs the system about the pressure at that moment.

Software PID control makes possible to reach and maintain the fixed pressure set points.

Each pressure maintainer works in turn as a volume change device.

#### Maintainers can be configured and used as:

- Lateral, confining or cell pressure
- Back pressure.
- Upper back pressure
- Volume change device

#### ADVANCED TEST

- Can be used as high precision volume change device. (0,014 mm<sup>3</sup>)
- Can be used where a high precision pressure is needed
- Can be used in research projects where a hydraulic gradient is needed.

**DURING DATA ACQUISITION**

Once the sample is in place and the test conditions are configured, the system will entirely perform the desired test (triaxial, consolidation, saturation or permeability) from beginning to end. The triaxial system is controlled by our leading-edge EDS A.I. software that automates permeability, saturation, consolidation (isotropic and anisotropic) and the triaxial test itself.

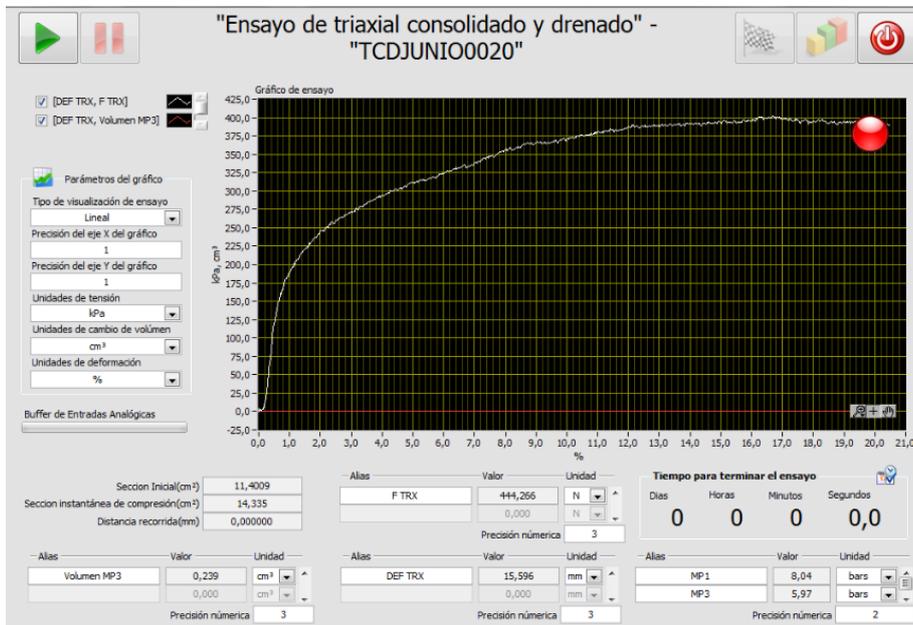
The system is a compact and complete unit containing everything required to perform fully automated tests. Independent PID controls are used to accurately apply velocity and or pressure.

**ADVANTAGES FOR USERS**

This system can be used with any triaxial apparatus. When used together with Proetisa's Soilmatic Series Triaxial Machine the same software will select test velocity and any other parameter.

The standard frame test has a maximum load capacity of 50 kN. Higher capacity models are also available.

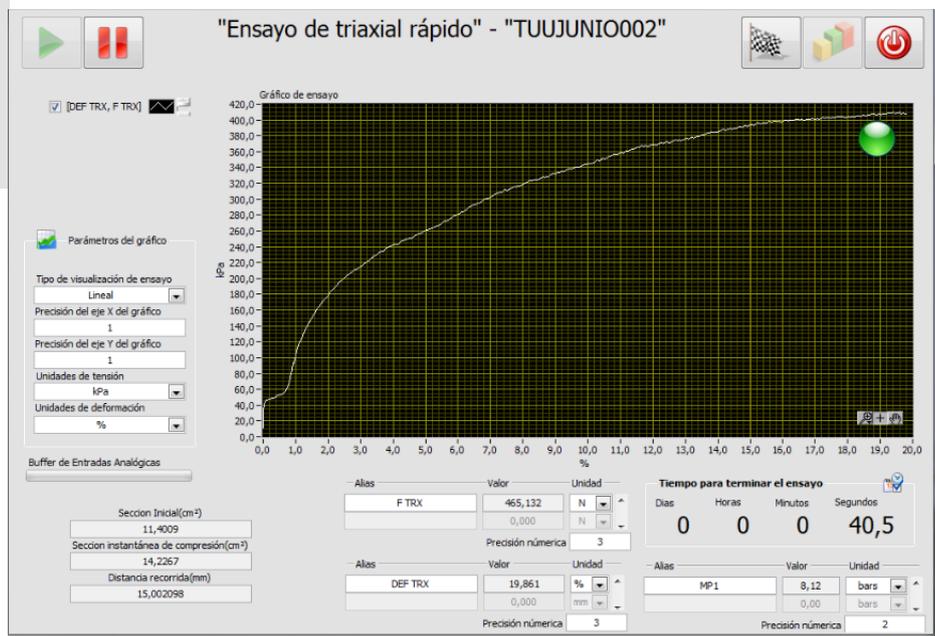
**STANDARD TEST METHODS - UNE 103402, ASTM D-4767, AASHTO T-297, COE EM 1110**



It makes also possible to automatically perform any test. (Triaxial (UU, CU and CD), permeability, consolidation and saturation.

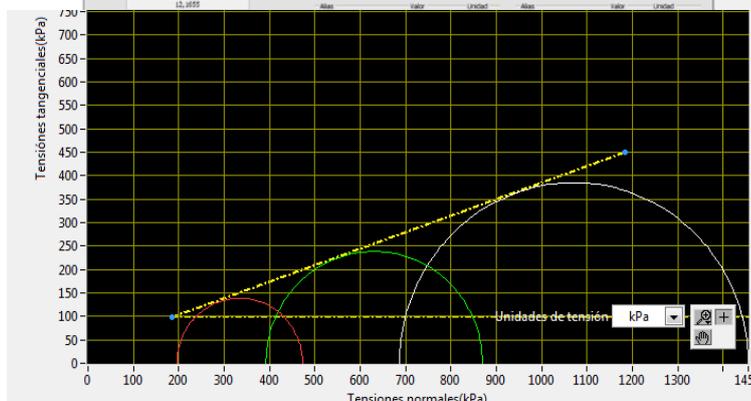
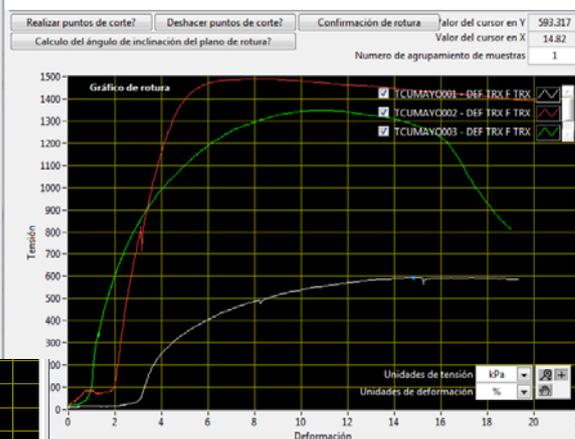
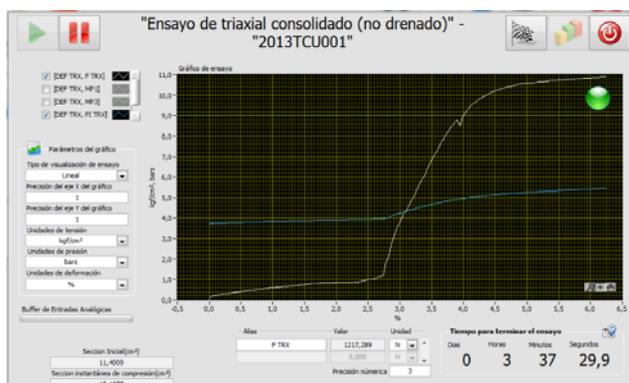
If needed more pressure maintainers could be added.

*"B" check .Once the sample is saturated, EDS Software will stop the system and inform you that the saturation process has finished. It will display sensor readings in graphs and calculate "B" coefficient in real time.*



### EDS software

- Multi-task control and data acquisition. You will be able to, for example, carry out a triaxial test and saturation at the same time, or both quick triaxial and a permeability tests.
- The software application will allow you to open several windows at the same time displaying the different tests that are being carried out at that time.
- Real time graphs with acquired data.
- You will be able to activate or deactivate the sensors display without data loss.
- You will be able to change graph units, for example: display values in bars, kg/cm2 or kPa, etc.
- Likewise, it is possible to choose between linear or logarithmic time scales.
- Graphs have an auto function that adjusts it to its real size. It is possible to zoom and enlarge areas of interest or change the way in which data are displayed, toggle between dots and lines, view minimum and maximum values, etc.
- Virtual display with elapsed and remaining time.
- Event configuration allowing the user to stop tests, accelerate data acquisition, activate alarms, etc.
- Software makes it possible to define values in order to finish tests depending on force, strain, stroke, pressure, volume, etc.



### S0220/SM2 include:

- 2 Pressure maintainer S0169/SM
- 1 Triaxial frame S0150/SM.

### LATER ANALYSIS

You will be able to process and plot all the recorded data and print results in Word format or export data to Microsoft Excel.

## S0220/SM3 Automated Triaxial Testing System

**Pressure ranges:**

- 0 - 1MPa (0-10 bar)
- 0 - 2MPa (0-20 bar)
- 0 - 3MPa (0-30 bar)
- 0 - 4MPa (0-40 bar)
- 0 - 5MPa (0-50 bar)

**Volume capacity:** 230cc

**Interface:** Touchscreen / USB connection  
(other pressure range - Consult us)

**Force ranges:**

50kN, 100kN, 200kN

**Triaxial Cells:**

1.700kPa to 3.000 kPa

**Diameters:**

38mm to 150mm

(other diameters - Consult us)

(other pressure ranges - Consult us)



**Fully Automated three Pressure Triaxial System**

All in one three pressure automated system for any kind of triaxial tests (TUU, TCU and TCD). It makes also possible to automatically perform permeability, consolidation and saturation tests.

The standard model has three pressure / volume maintainers that can be configured and controlled in a fully automated and independent way.

You just have to configure the test with the desired parameters and the software will automatically proceed to saturate the sample. Once the sample is saturated, EDS Software will stop the system and inform you that the saturation process has finished. It will display sensor readings in graphs and calculate "B" coefficient in real time.

Consolidation as well as UU, CD and CU triaxial tests are fully automated. Once consolidation is completed, you will be able to use the software to calculate the appropriate breaking velocity for the material that has been consolidated.

Pressure and volume maintainers will automatically keep the pressure value fixed during the test.

All readings are graphed in real time during the test and stored in a database in the PC for later processing. If desired, you will be able to apply corrections related to membrane thickness, paper drains, etc.

**Pressure Maintainers.**

250cc Capacity.

10, 20, 30, 40 and 50 bar Models.

Entirely made of bronze.

Each maintainer has a sensor that informs the system about the pressure at that moment.

Software PID control makes possible to reach and maintain the fixed pressure set points.

Each pressure maintainer works in turn as a volume change device.

**Maintainers can be configured and used as:**

- Lateral, confining or cell pressure
- Back pressure.
- Upper back pressure
- Volume change device

**ADVANCED TEST**

- Can be used as high precision volume change device. (0,014 mm<sup>3</sup>)
- Can be used where a high precision pressure is needed
- Can be used in research projects where a hydraulic gradient is needed.

### DURING DATA ACQUISITION

Once the sample is in place and the test conditions are configured, the system will entirely perform the desired test (triaxial, consolidation, saturation or permeability) from beginning to end. The triaxial system is controlled by our leading-edge EDS A.I. software that automates permeability, saturation, consolidation (isotropic and anisotropic) and the triaxial test itself.

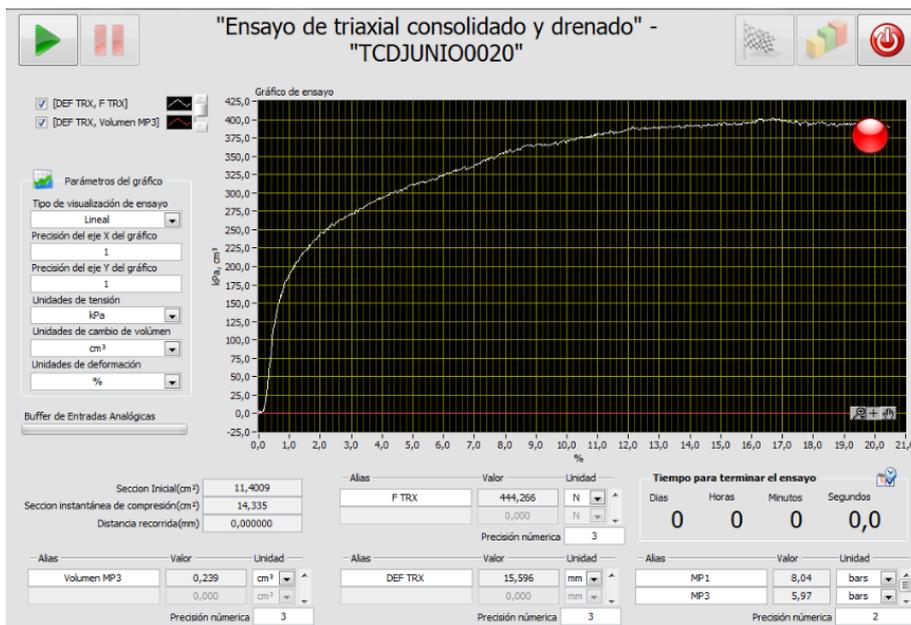
The system is a compact and complete unit containing everything required to perform fully automated tests. Independent PID controls are used to accurately apply velocity and or pressure.

### ADVANTAGES FOR USERS

This system can be used with any triaxial apparatus. When used together with Proetisa's Soilmatic Series Triaxial Machine the same software will select test velocity and any other parameter.

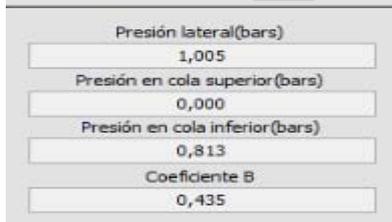
The standard frame test has a maximum load capacity of 50 kN. Higher capacity models are also available.

### STANDARD TEST METHODS - UNE 103402, ASTM D-4767, AASHTO T-297, COE EM 1110

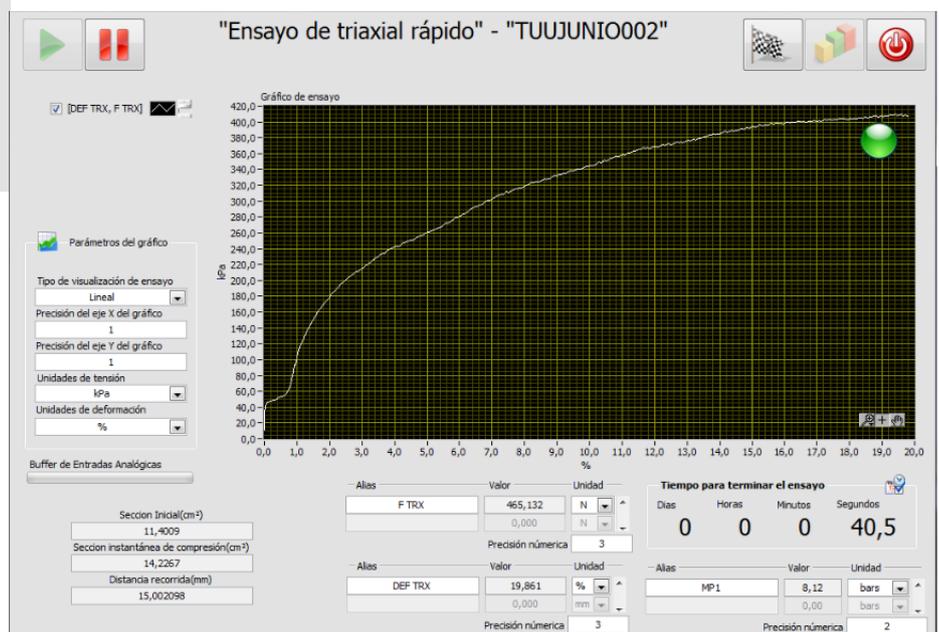


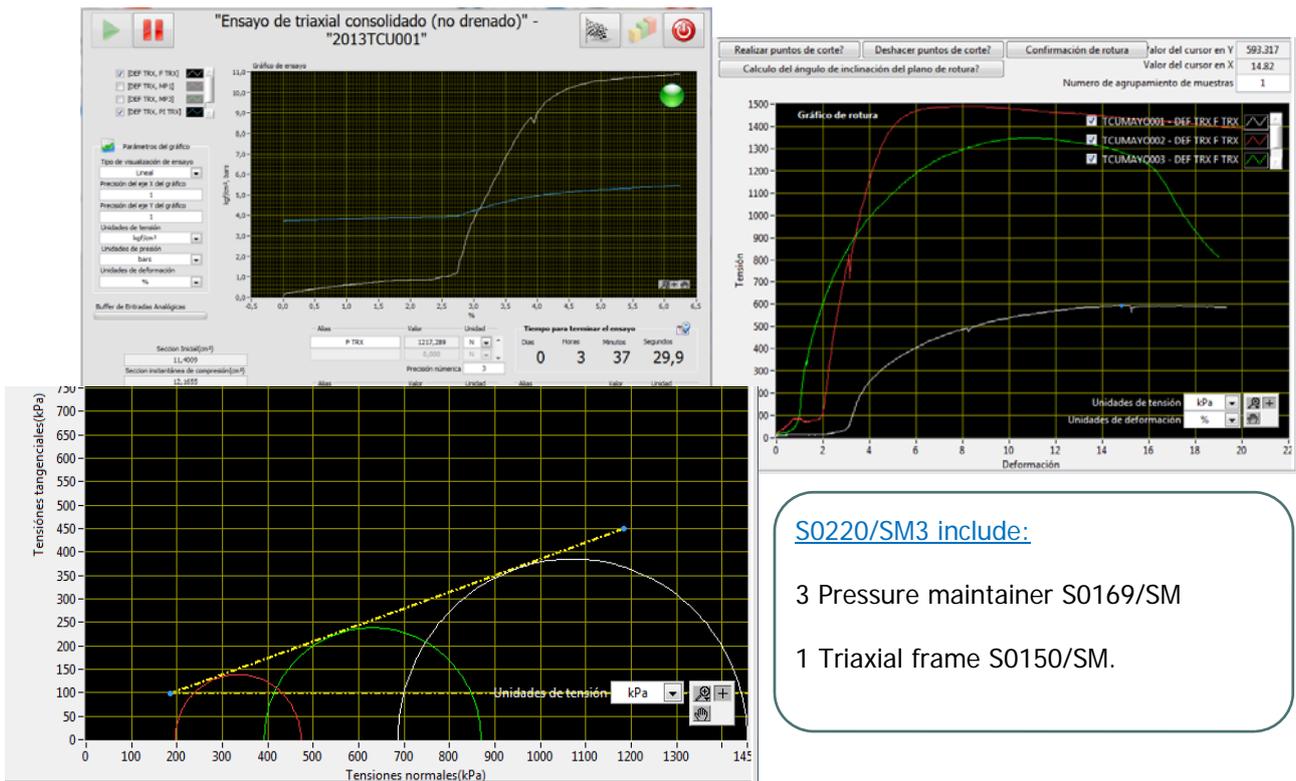
It makes also possible to automatically perform any test. (Triaxial (UU, CU and CD), permeability, consolidation and saturation.

If needed more pressure maintainers could be added.



*"B" check .Once the sample is saturated, EDS Software will stop the system and inform you that the saturation process has finished. It will display sensor readings in graphs and calculate "B" coefficient in real time.*





S0220/SM3 include:

3 Pressure maintainer S0169/SM

1 Triaxial frame S0150/SM.

**LATER ANALYSIS**

You will be able to process and plot all the recorded data and print results in Word format or export data to Microsoft Excel.

**EDS software**

- Multi-task control and data acquisition. You will be able to, for example, carry out a triaxial test and saturation at the same time, or both quick triaxial and a permeability tests.
- The software application will allow you to open several windows at the same time displaying the different tests that are being carried out at that time.
- Real time graphs with acquired data.
- You will be able to activate or deactivate the sensors display without data loss.
- You will be able to change graph units, for example: display values in bars, kg/cm2 or kPa, etc.
- Likewise, it is possible to choose between linear or logarithmic time scales.
- Graphs have an auto function that adjusts it to its real size. It is possible to zoom and enlarge areas of interest or change the way in which data are displayed, toggle between dots and lines, view minimum and maximum values, etc.
- Virtual display with elapsed and remaining time.
- Event configuration allowing the user to stop tests, accelerate data acquisition, activate alarms, etc.
- Software makes it possible to define values in order to finish tests depending on force, strain, stroke, pressure, volume, etc.

### S0220/SM4 Automated Triaxial Testing System

#### Pressure ranges:

0 - 1MPa (0-10 bar)  
0 - 2MPa (0-20 bar)  
0 - 3MPa (0-30 bar)  
0 - 4MPa (0-40 bar)  
0 - 5MPa (0-50 bar)

**Volume capacity:** 230cc

**Interface:** Touchscreen / USB connection  
(other pressure range - Consult us)

#### Force ranges:

50kN, 100kN, 200kN

#### Triaxial Cells:

1.700kPa to 3.000 kPa

#### Diameters:

38mm to 150mm

(other diameters - Consult us)

(other pressure ranges - Consult us)



#### Fully Automated four Pressure Triaxial System

All in one four pressure automated system for any kind of triaxial tests (TUU, TCU and TCD). It makes also possible to automatically perform permeability, consolidation and saturation tests.

The standard model has four pressure / volume maintainers that can be configured and controlled in a fully automated and independent way.

You just have to configure the test with the desired parameters and the software will automatically proceed to saturate the sample. Once the sample is saturated, EDS Software will stop the system and inform you that the saturation process has finished. It will display sensor readings in graphs and calculate "B" coefficient in real time. Consolidation as well as UU, CD and CU triaxial tests are fully automated. Once consolidation is completed, you will be able to use the software to calculate the appropriate breaking velocity for the material that has been consolidated.

Pressure and volume maintainers will automatically keep the pressure value fixed during the test.

All readings are graphed in real time during the test and stored in a database in the PC for later processing. If desired, you will be able to apply corrections related to membrane thickness, paper drains, etc.

#### Pressure Maintainers.

250cc Capacity.

10, 20, 30, 40 and 50 bar Models.

Entirely made of bronze.

Each maintainer has a sensor that informs the system about the pressure at that moment.

Software PID control makes possible to reach and maintain the fixed pressure set points.

Each pressure maintainer works in turn as a volume change device.

#### Maintainers can be configured and used as:

- Lateral, confining or cell pressure
- Back pressure.
- Upper back pressure
- Volume change device

#### ADVANCED TEST

- Can be used as high precision volume change device. (0,014 mm<sup>3</sup>)
- Can be used where a high precision pressure is needed
- Can be used in research projects where a hydraulic gradient is needed.

**DURING DATA ACQUISITION**

Once the sample is in place and the test conditions are configured, the system will entirely perform the desired test (triaxial, consolidation, saturation or permeability) from beginning to end. The triaxial system is controlled by our leading-edge EDS A.I. software that automates permeability, saturation, consolidation (isotropic and anisotropic) and the triaxial test itself.

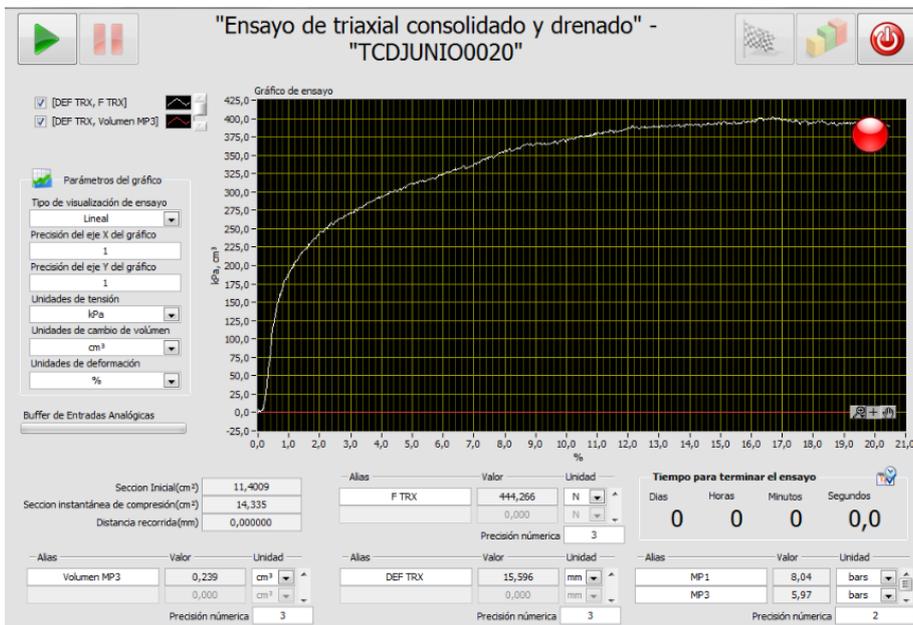
The system is a compact and complete unit containing everything required to perform fully automated tests. Independent PID controls are used to accurately apply velocity and or pressure.

**ADVANTAGES FOR USERS**

This system can be used with any triaxial apparatus. When used together with Proetisa's Soilmatic Series Triaxial Machine the same software will select test velocity and any other parameter.

The standard frame test has a maximum load capacity of 50 kN. Higher capacity models are also available.

**STANDARD TEST METHODS - UNE 103402, ASTM D-4767, AASHTO T-297, COE EM 1110**



It makes also possible to automatically perform any test. (Triaxial (UU, CU and CD), permeability, consolidation and saturation.

If needed more pressure maintainers could be added.

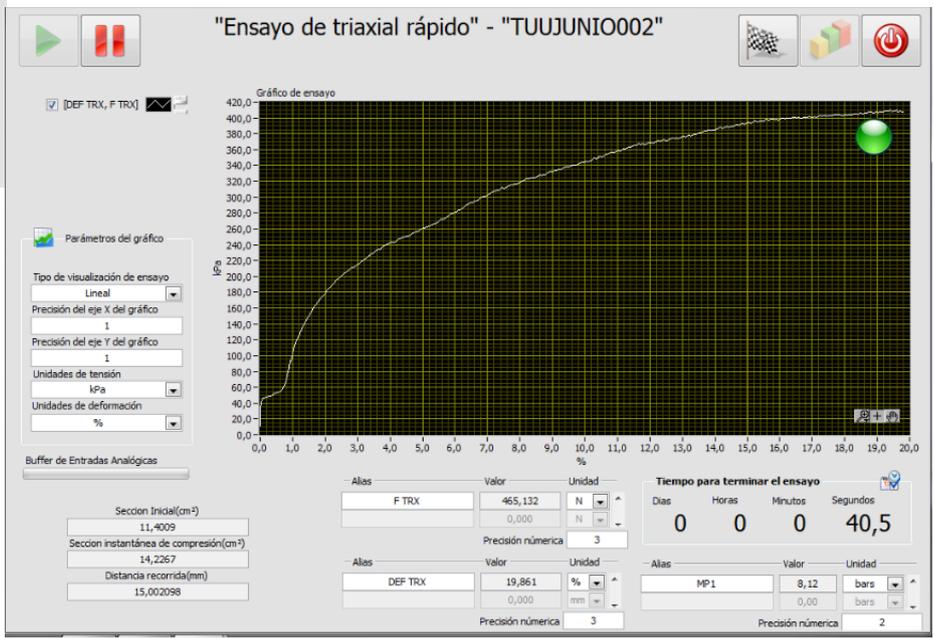
Presión lateral(bars): 1,005

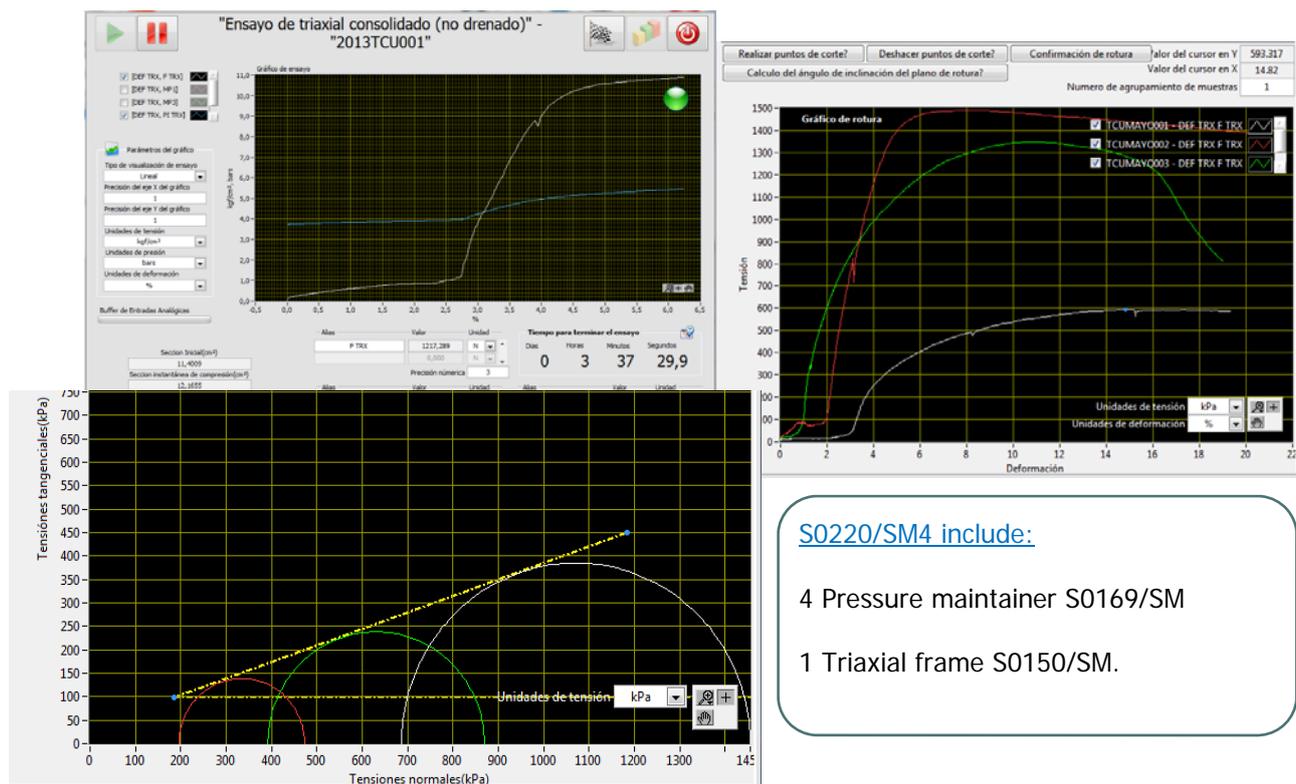
Presión en cola superior(bars): 0,000

Presión en cola inferior(bars): 0,813

Coefficiente B: 0,435

*"B" check .Once the sample is saturated, EDS Software will stop the system and inform you that the saturation process has finished. It will display sensor readings in graphs and calculate "B" coefficient in real time.*





### S0220/SM4 include:

- 4 Pressure maintainer S0169/SM
- 1 Triaxial frame S0150/SM.

### LATER ANALYSIS

You will be able to process and plot all the recorded data and print results in Word format or export data to Microsoft Excel.

### EDS software

- Multi-task control and data acquisition. You will be able to, for example, carry out a triaxial test and saturation at the same time, or both quick triaxial and a permeability tests.
- The software application will allow you to open several windows at the same time displaying the different tests that are being carried out at that time.
- Real time graphs with acquired data.
- You will be able to activate or deactivate the sensors display without data loss.
- You will be able to change graph units, for example: display values in bars, kg/cm<sup>2</sup> or kPa, etc.
- Likewise, it is possible to choose between linear or logarithmic time scales.
- Graphs have an auto function that adjusts it to its real size. It is possible to zoom and enlarge areas of interest or change the way in which data are displayed, toggle between dots and lines, view minimum and maximum values, etc.
- Virtual display with elapsed and remaining time.
- Event configuration allowing the user to stop tests, accelerate data acquisition, activate alarms, etc.
- Software makes it possible to define values in order to finish tests depending on force, strain, stroke, pressure, volume, etc.

## S0220/SM Automated Triaxial Testing System

### Pressure ranges:

- 0 - 1MPa (0-10 bar)
- 0 - 2MPa (0-20 bar)
- 0 - 3MPa (0-30 bar)
- 0 - 4MPa (0-40 bar)
- 0 - 5MPa (0-50 bar)

**Volume capacity:** 230cc

**Interface:** Touchscreen / USB connection  
(other pressure range - Consult us)

### Force ranges:

50kN, 100kN, 200kN



### Triaxial Cells:

1.700kPa to 3.000 kPa

### Diameters:

38mm to 150mm

(other diameters - Consult us)  
(other pressure ranges - Consult us)

### Fully Automated four Pressure Triaxial System

All in one four pressure automated system for any kind of triaxial tests (TUU, TCU and TCD). It makes also possible to automatically perform permeability, consolidation and saturation tests.

The standard model has four pressure / volume maintainers that can be configured and controlled in a fully automated and independent way.

You just have to configure the test with the desired parameters and the software will automatically proceed to saturate the sample. Once the sample is saturated, EDS Software will stop the system and inform you that the saturation process has finished. It will display sensor readings in graphs and calculate "B" coefficient in real time.

Consolidation as well as UU, CD and CU triaxial tests are fully automated. Once consolidation is completed, you will be able to use the software to calculate the appropriate breaking velocity for the material that has been consolidated.

Pressure and volume maintainers will automatically keep the pressure value fixed during the test.

All readings are graphed in real time during the test and stored in a database in the PC for later processing. If desired, you will be able to apply corrections related to membrane thickness, paper drains, etc.

### Pressure Maintainners.

250cc Capacity.

10, 20, 30, 40 and 50 bar Models.

Entirely made of bronze.

Each maintainer has a sensor that informs the system about the pressure at that moment.

Software PID control makes possible to reach and maintain the fixed pressure set points.

Each pressure maintainer works in turn as a volume change device.

### Maintainers can be configured and used as:

- Lateral, confining or cell pressure
- Back pressure.
- Upper back pressure
- Volume change device

### ADVANCED TEST

- Can be used as high precision volume change device. (0,014 mm<sup>3</sup>)
- Can be used where a high precision pressure is needed
- Can be used in research projects where a hydraulic gradient is needed.

### DURING DATA ACQUISITION

Once the sample is in place and the test conditions are configured, the system will entirely perform the desired test (triaxial, consolidation, saturation or permeability) from beginning to end. The triaxial system is controlled by our leading-edge EDS A.I. software that automates permeability, saturation, consolidation (isotropic and anisotropic) and the triaxial test itself.

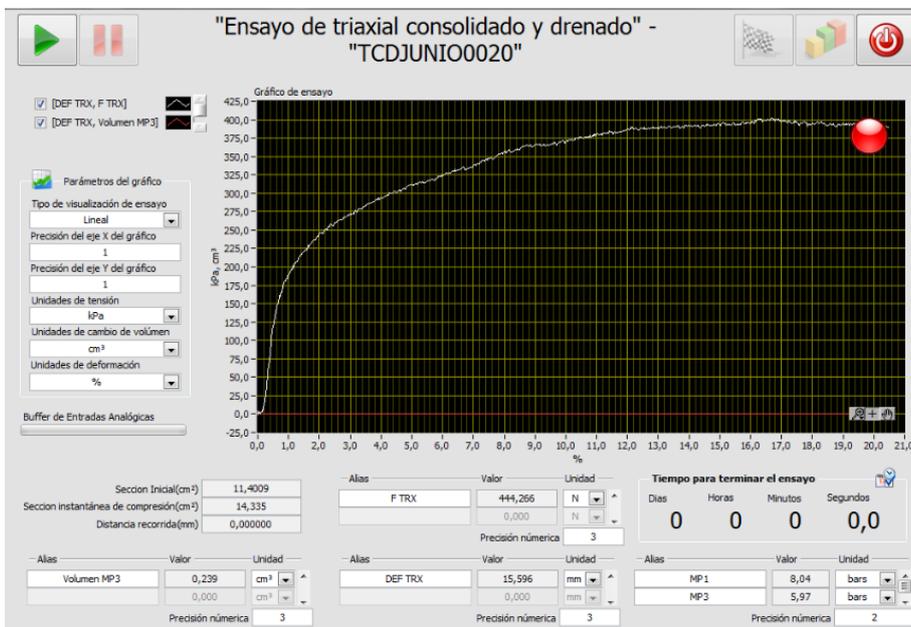
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### ADVANTAGES FOR USERS

This system can be used with any triaxial apparatus. When used together with Proetisa's Soilmatic Series Triaxial Machine the same software will select test velocity and any other parameter.

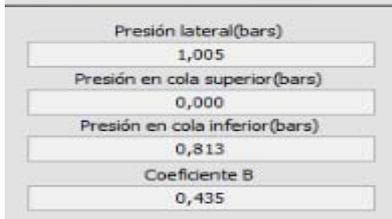
The standard frame test has a maximum load capacity of 50 kN. Higher capacity models are also available.

**STANDARD TEST METHODS - UNE 103402, ASTM D-4767, AASHTO T-297, COE EM 1110**

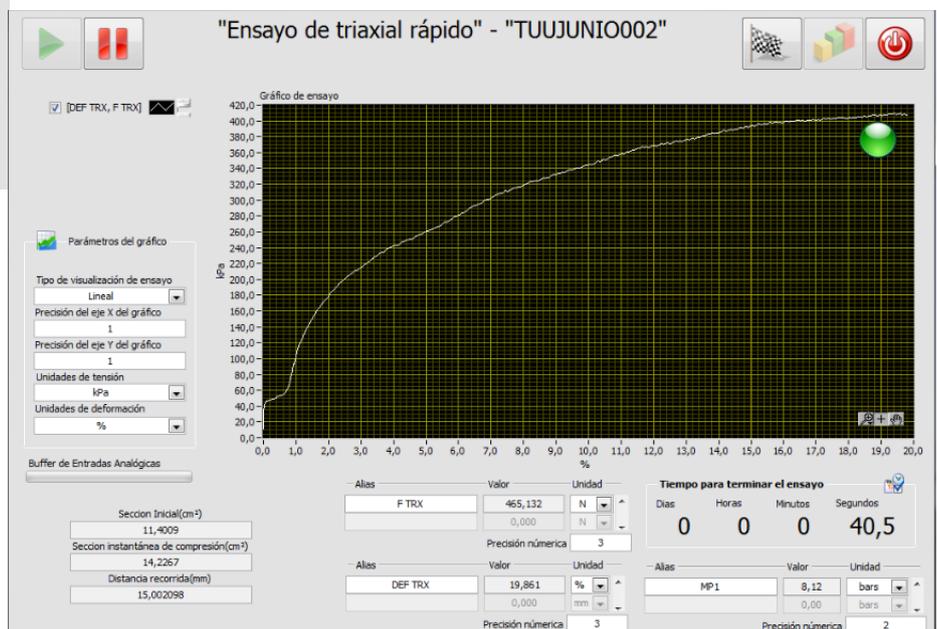


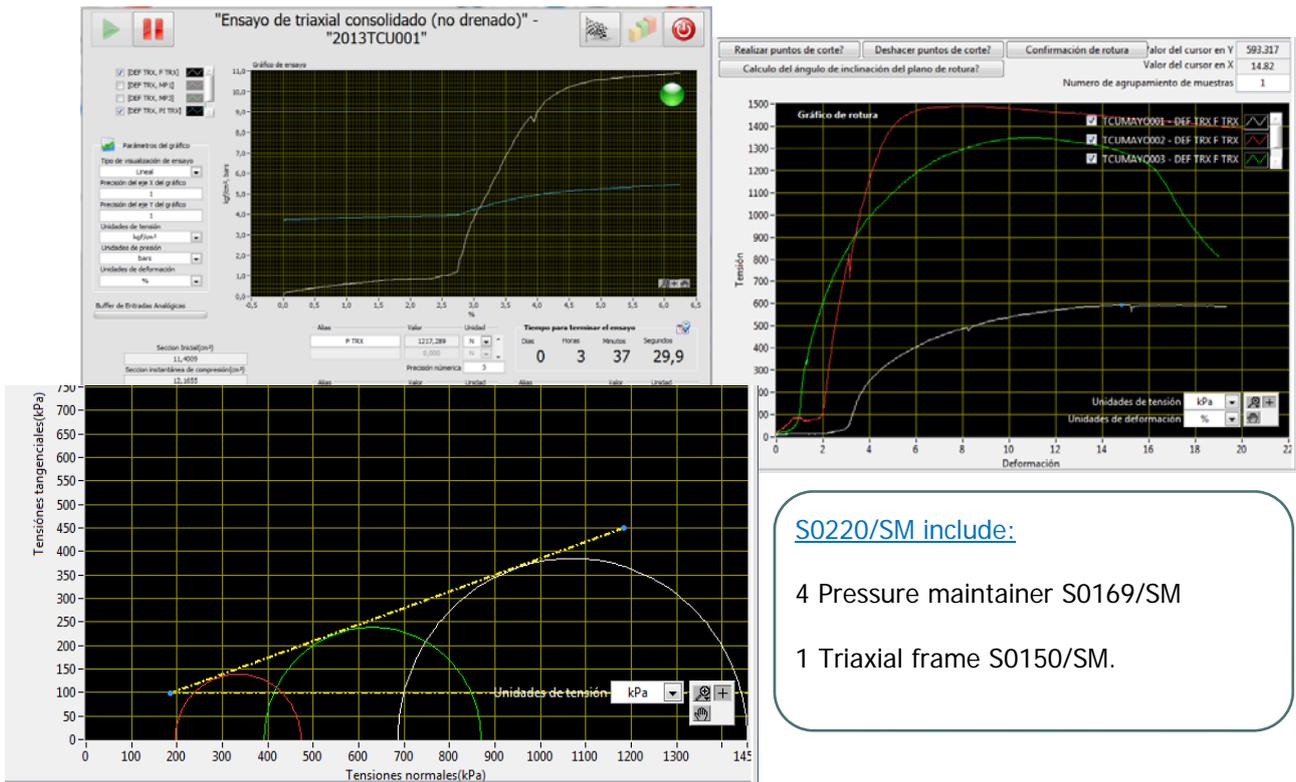
It makes also possible to automatically perform any test. (Triaxial (UU, CU and CD), permeability, consolidation and saturation.

If needed more pressure maintainers could be added.



*"B" check .Once the sample is saturated, EDS Software will stop the system and inform you that the saturation process has finished. It will display sensor readings in graphs and calculate "B" coefficient in real time.*





**LATER ANALYSIS**

You will be able to process and plot all the recorded data and print results in Word format or export data to Microsoft Excel.

**EDS software**

- Multi-task control and data acquisition. You will be able to, for example, carry out a triaxial test and saturation at the same time, or both quick triaxial and a permeability tests.
- The software application will allow you to open several windows at the same time displaying the different tests that are being carried out at that time.
- Real time graphs with acquired data.
- You will be able to activate or deactivate the sensors display without data loss.
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- Likewise, it is possible to choose between linear or logarithmic time scales.
- Graphs have an auto function that adjusts it to its real size. It is possible to zoom and enlarge areas of interest or change the way in which data are displayed, toggle between dots and lines, view minimum and maximum values, etc.
- Virtual display with elapsed and remaining time.
- Event configuration allowing the user to stop tests, accelerate data acquisition, activate alarms, etc.
- Software makes it possible to define values in order to finish tests depending on force, strain, stroke, pressure, volume, etc.

### S0220/SMP Automated Permeability Testing System

#### FULLY AUTOMATED PERMEABILITY

The Soilmatic permeability system provides a unique and versatile way to run flexible wall permeability tests on a wide variety of materials quickly and accurately.

The system can measure permeabilities of cohesive soils varying from  $10^{-4}$  to  $10^{-9}$  cm/sec. With the appropriate test cells, this one system can determine the permeability of some silty clays within minutes.

The pressure / volumen maintainers includes a motor, pressure chamber and piston, pressure transducer, PID control and USB communications. Versions of the unit are available with flow volumes of 233 cm<sup>3</sup> and bigger capacities.

Flexible wall tests are run in a fully automated mode with three pressure / volume maintainers:

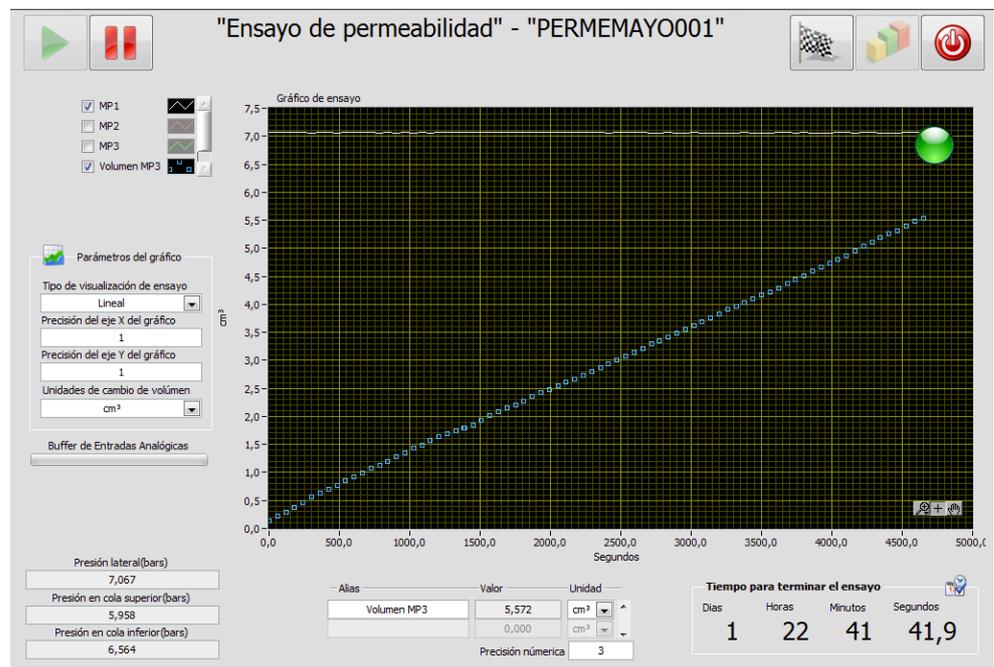
- One controls cell pressure and flow of cell
- One controls bottom sample
- One controls top sample.

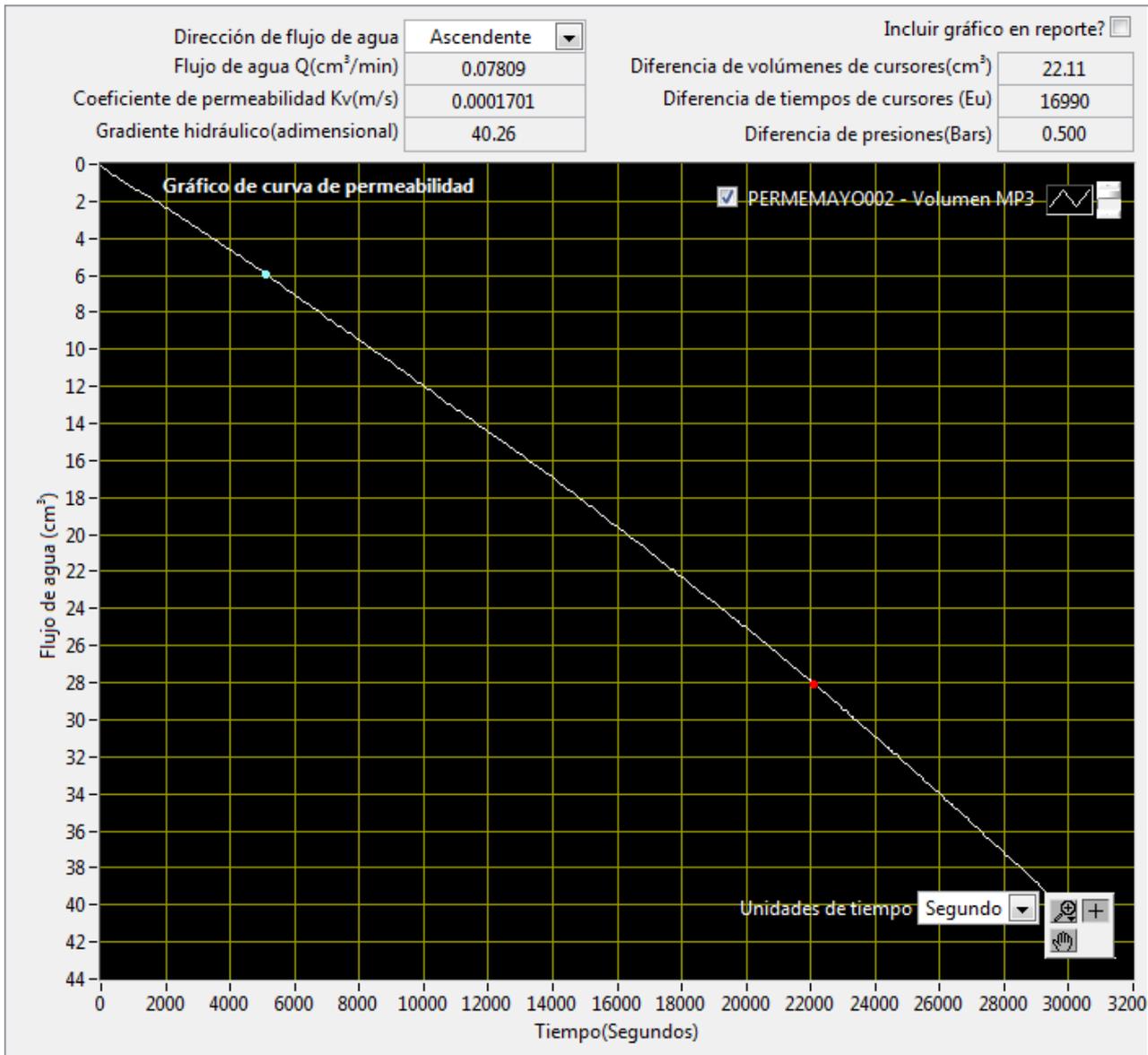
This configuration allows great versatility to run fully automated permeability tests with isotropic or anisotropic.

The entire test can be automatically controlled, data captured and displayed in real time, and test reports prepared on a PC.

You just have to configure the test with the desired parameters and the software will automatically proceed to saturate the sample. Once the sample is saturated, EDS Software will stop the system and inform you that the saturation process has finished.

The triaxial system is controlled by our leading-edge EDS A.I. software that automates permeability, saturation test itself





Later analysis, you will be able to process and plot all the recorded data and calculate:

- Permeability coefficient
- Hydraulic Gradient
- Flow between to points.
- Send data to Excel

**STANDARD TEST METHODS**

- ASTM D-5084
- ASTM D-2434