



LAMY
RHEOLOGY
INSTRUMENTS

OPERATING MANUAL

TX-700



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1. GENERAL VIEW OF YOUR INSTRUMENT



2. FEATURES OF YOUR INSTRUMENT

• **Touch Screen**

The New TX-700 line is entirely equipped with one 7” color touch screen. It is giving you a greater comfort to work and a clearer view of data and results of analysis and curves without external software.

• **Strong double rod frame**

Our instruments frames are very strong. They are composed of 2 high rods that allow an easy and sure displacement with a high precision and no vibrations.








• **PT100 temperature probe**

Your TX-700 has one Pt100 probe including. This probe can give you either the room temperature where the measurement is made or directly the sample temperature if its size is enough large.

• **Load cell sensor**

We have developed a series of various load cells according to your needs. On request you could ordered to have the possibility to change by yourself the load cell on your TX-700.

3. STATUS ICONS

	No device is connected to the instrument
	Only one device is connected to the instrument
	Two devices are connected to the instrument
	Temperature given by the Pt100 probe
	Access to the instrument parameters
	Go to main menu
	Go to previous menu

4. CONTENT AND INSTALLATION OF YOUR INSTRUMENT

4.1 Installation

The installation of the TX-700 is very easy. Indeed, right after you install a measuring probe you are able to start your measurement.



Your TX-700 is composed of:

- One measuring Load cell
- One Strong stand
- One turning led holder
- One Pt100 sensor
- One or several measuring probe according your need

At rear side, please connect the power supply voltage cable and all connecting cable you need to work:

- Pt100 sensor
- USB or RS232 cable if you must remote the unit form a computer.

Screw the probe to the load cell and adjust the turntable in function of the sample height.

To switch on your TX-700, please switch on the ON/OFF button located on the rear part of instrument above the power supply plug.

4.2 Sensor change

Step 1: **TURN OFF** the device before make any sensor change



Step 2: Disconnect the connector by lifting the collar.



Step 3: Hold and unscrew the previous sensor.

Step 4: Realign the new sensor and screw it again.



Step 5: Reinsert the connector by aligning the two red dots (locators) and push until you hear the click.

Step 6: Turn ON the device, then go to the « SERVICES » menu in the parameter menu.

- Enter the PIN CODE : 8426
- Go to « Sensor Scale »
- Adjust the force according to the new sensor
- Validate
- You can now effectuate your measurement with the new sensor.

5. PRIMARY CONCEPTS

5.1. Main Menu

Main menu allows you to browse between the different tabs of your TX-700. This menu allows selection of the measurement mode you want and also to access saved data files with “Results” tab. The “Remote control” tab is used when you want to connect the TX-700 to a computer in order to drive it by the external optional software TEX’AN DRIVE.

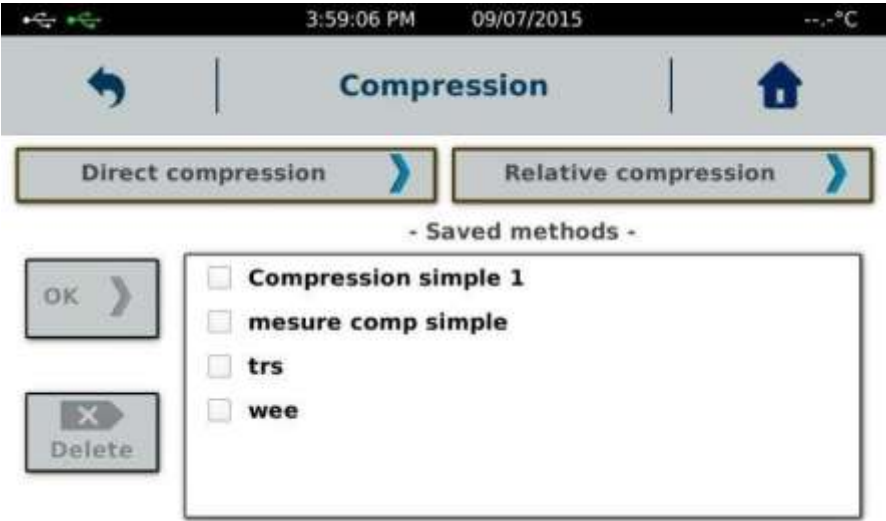


5.2. Compression mode

« **Compression** » is the basic test of your TX-700. Indeed, it allows you to do a compression test with a defined speed and distance. The maximum forces F_{max} is measured and saved. Eventually another force to a defined distance can be assessed (for breaking sample for example).



Select Direct Compression, Relative Compression or a saved method previously registered in the TX-700 memory:

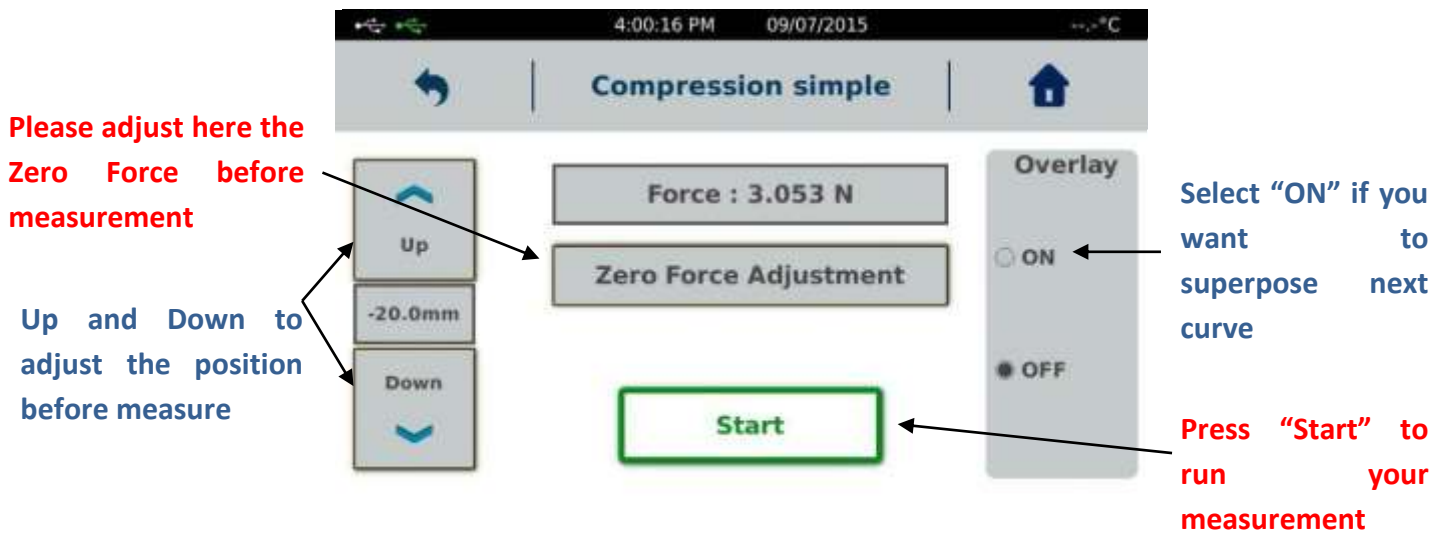


5.2.1 Direct compression

This mode is use to make a COMPRESSION MEASUREMENT with a DEFINED SPEED and a DEFINED DISTANCE (in mm) in the sample.

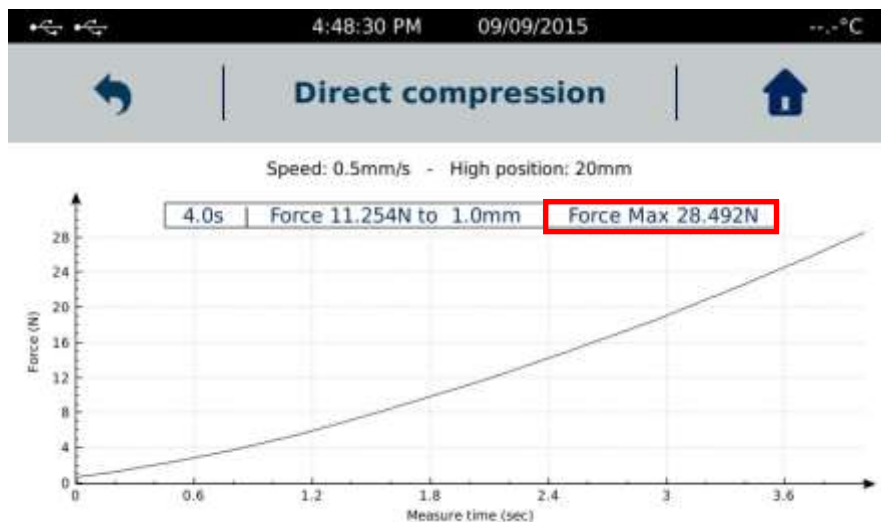


Click "Valid" to start measure. This screen appears:



Curve and results of Direct Compression

All values, like F_{max} or Force at specific distance, and the complete measuring curve are displayed as following:

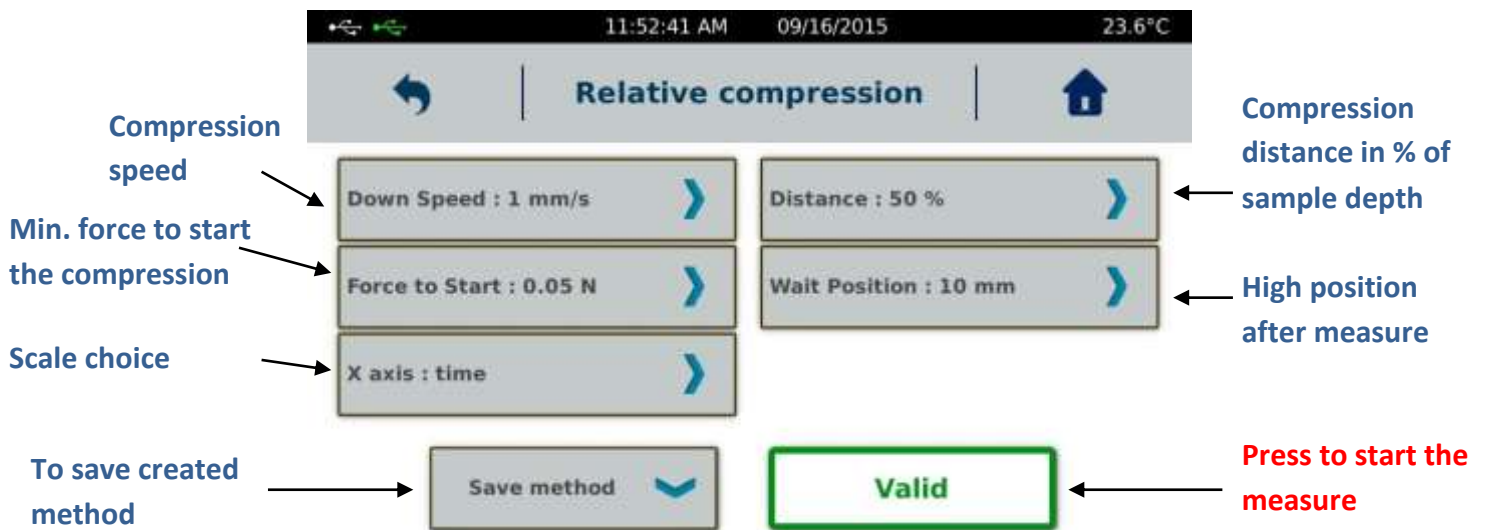


You could print the DATA results with a Dymo 450 TURBO (ticket format) or with an A4 printer compatible with HP PCL5 driver allowing the curve to be printed in this second case. You could also save your data by pressing the "SAVE" tab on screen. A file name will be asked to save it in the internal memory of the TX-700.

5.2.2 Relative Compression

This mode is used you make a COMPRESSION MEASUREMENT with a DEFINED SPEED and a RELATIVE DISTANCE (in % of sample depth).

It is compatible with the 3 following mode: **Compression**, **Compression/Relaxation**, **Compression/Relaxation/Tension**.



Adjust the start position of arm with "Up" and "Down" tabs in order to put the highest sample you want to measure by relative compression test.

NO SAMPLE ON HOLDER FOR THIS FIRST STEP, PLEASE

Fix the probe you want to use and press OK.



When the probe detects the holder, arm goes back to initial position and the following message appears:

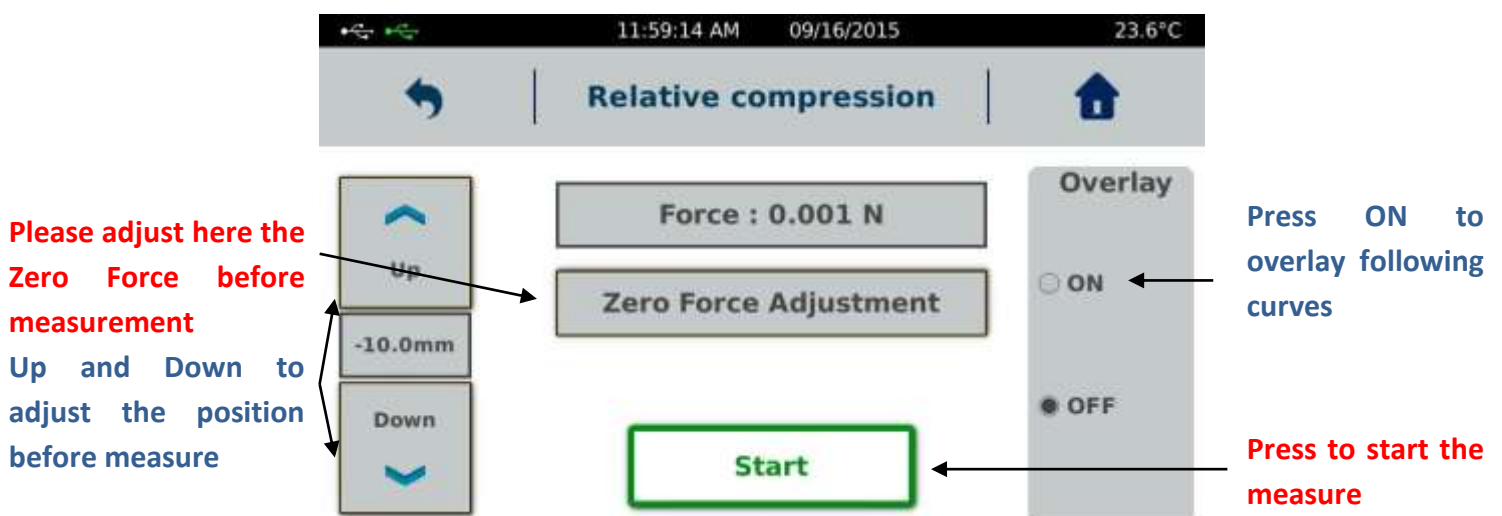


When the arm is back to its start position, you could place the sample to measure on the holder.

PLEASE, DON'T MOVE THE HOLDER OR ARM POSITION AT THIS TIME.

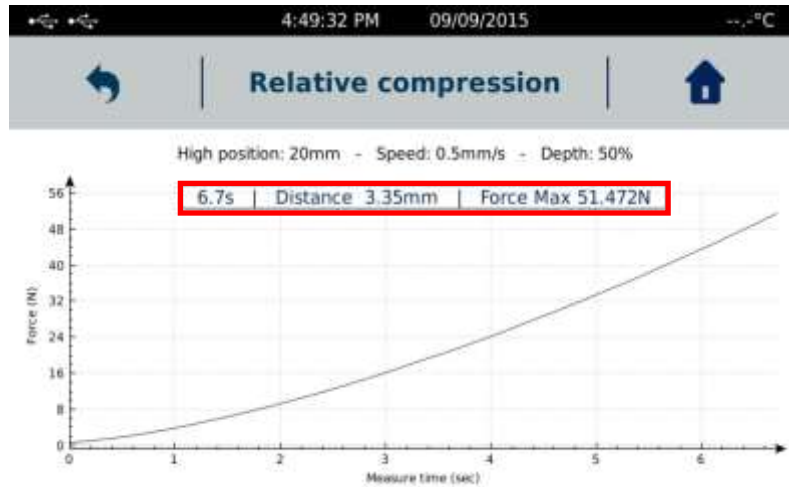


Click on "OK" and "start measure menu" appears:



Curve and Result of Relative Compression

All values and the complete measuring curve are displayed as following:



You could print the DATA results with a Dymo 450 TURBO (ticket format) or with an A4 printer compatible with HP PCL5 driver allowing the curve to be printed in this second case. You could also save your data by pressing the “SAVE” tab on screen. A file name will be asked to save it in the internal memory of the TX-700.

5.3 Mode Compression / Relaxation

“**Compression / Relaxation**” tab allows to add a relaxation time to a compression phase. During this time the Force is continuously measured and its evolution gives a % of Relaxation, which is inversely proportional to the elastic power of the sample:
% Relaxation = (FMax – Feq)*100/ FMax

To have a good characterization of elasticity of your sample, be careful to avoid destruction of the structure of sample during the Compression phase (by using a destructive probe (cone, blend...) or too big distance of compression). In this case, the relaxation phase becomes useless.

To use this mode, please select **Compress./Relax.** in Main menu.





5.3.1 Direct Compression / Relaxation

This mode is use to realize a COMPRESSION MEASUREMENT with a DEFINED SPEED and a DEFINED DISTANCE (in mm).

Select Direct Compression or Relative Compression or a saved method previously registered in TX-700 memory:

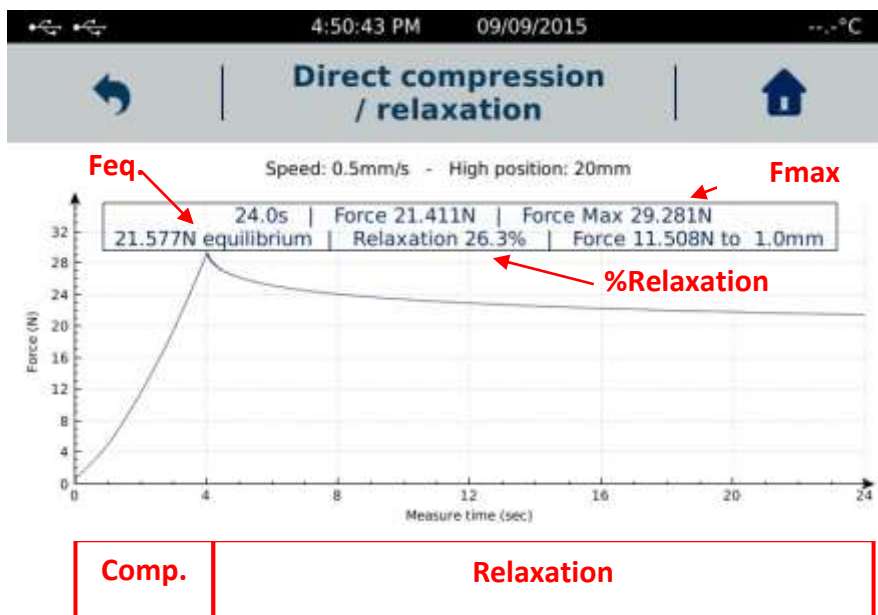


Start Measure Menu appears:



Curve and Results of Compression / Relaxation mode

All values and the complete measuring curve are displayed as following:



5.3.2 Relative Compression / Relaxation

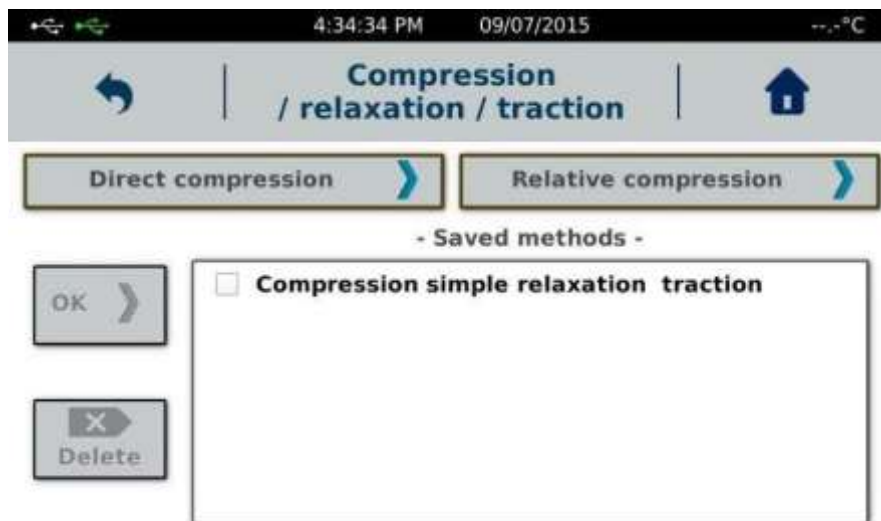
This mode is used to make a COMPRESSION MEASUREMENT with a DEFINED SPEED and a RELATIVE DISTANCE in % of depth sample.

Refer to part 5.2.2 Relative Compression and add the relaxation time you want to do.

5.4 Mode Compression / Relaxation / Tension

“Compression / Relaxation / Tension” tab allows adding a tension phase to a compression / relaxation test. After the Relaxation the measure continue during the ascent phase to the “wait position” with a defined speed. During this tension, the force is continuously measured and it gives the **Fmin** “higher” negative value (**Adhesive Force**) and a curve under 0 that characterize the adhesiveness of sample.

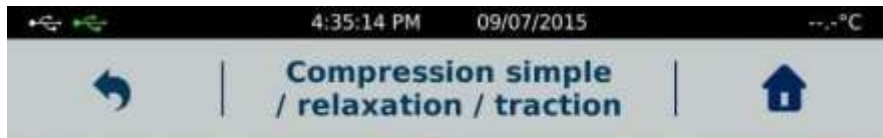
To do this mode, please select in Main menu **Compress./Relax./Tension**



5.4.1 Compression Directe / Relaxation / Traction

To make a COMPRESSION MEASUREMENT with a DEFINED SPEED and a DEFINED DISTANCE in mm in the sample

Select Direct Compression or Relative Compression or a saved method soon registered in TX-700 memory:



Compression speed → Down Speed : 0.5 mm/s >

Min. force to start compression → Force to Start : 0.05 N >

Scale choice → X axis : time >

Relaxation Time : 20 s >

Distance : 4 mm >

High position after measure → Wait Position : 20 mm >

Force at a given distance → Force à distance : 2 mm >

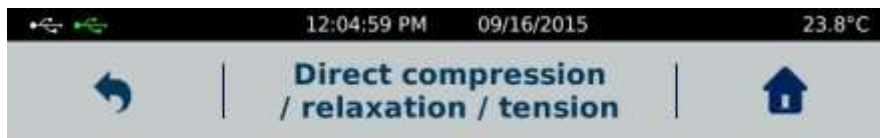
Up speed (Tension) → Up speed: 1 mm/s >

To save created method → Save method ▾

Valid

Press to start the measure

Start Measure Menu appears:



Please adjust here the Zero Force before measurement

Up and Down to adjust the position before measure

Force : 0.009 N

Zero Force Adjustment

Start

Overlay

ON

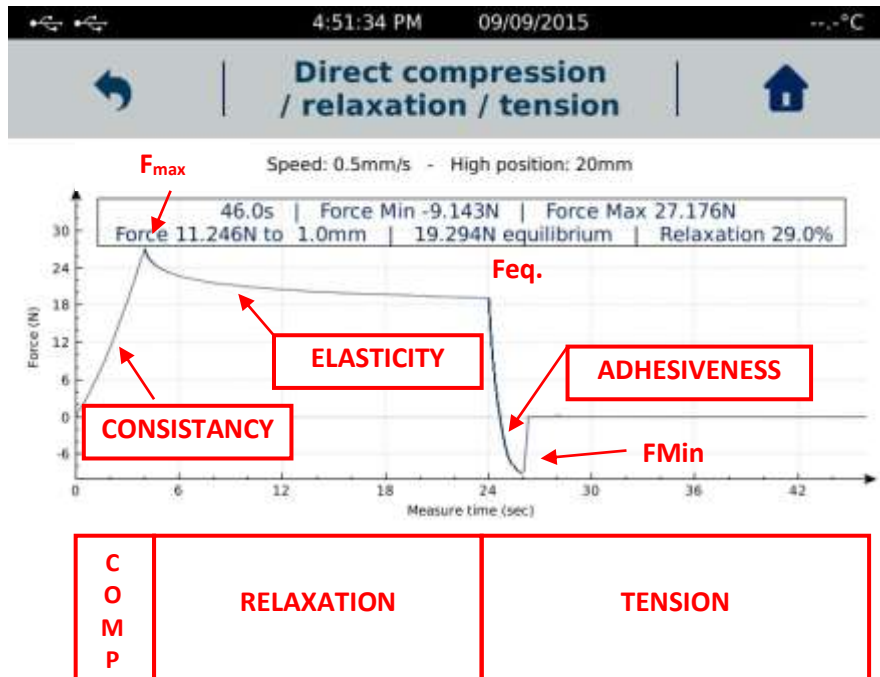
OFF

Press ON to overlay following curves

Press to start the measure

Curve and Result of Direct Compression

All values and the complete measuring curve are displayed as following:



5.4.2 Relative Compression / Relaxation / Tension

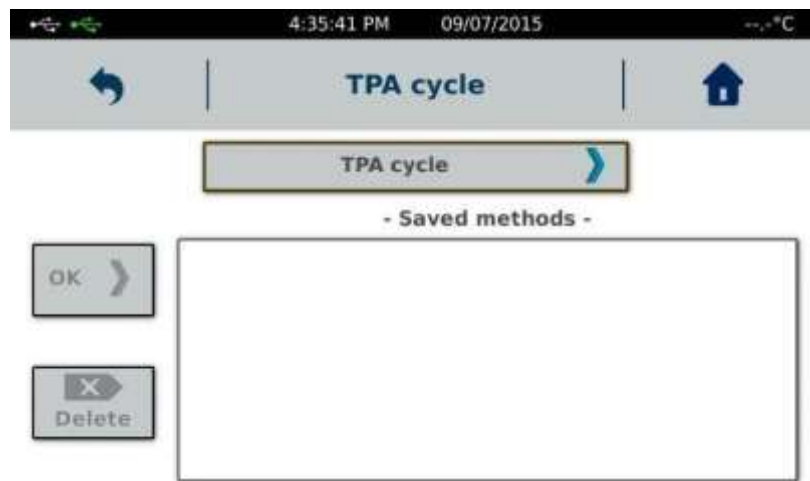
This mode is use to make a COMPRESSION MEASUREMENT with a DEFINED SPEED and a RELATIVE DISTANCE in % OF DEPTH SAMPLE.

Refer to part 5.2.2 Relative Compression and add the relaxation time and up speed you want.

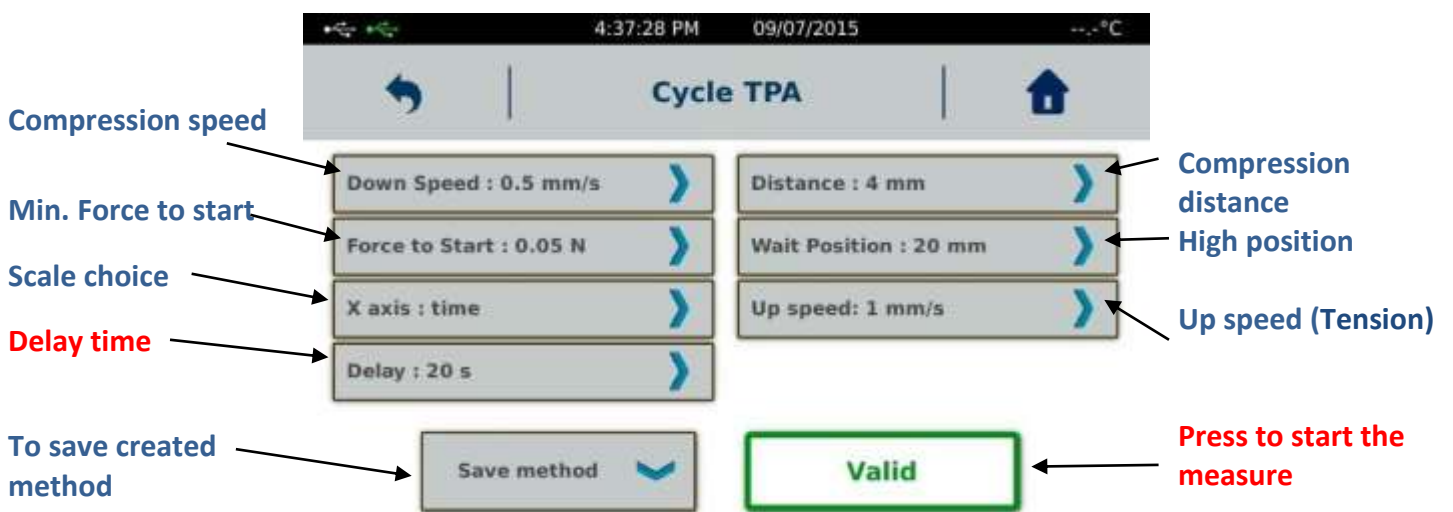
5.5 TPA Cycle

“**TPA Cycle**” allows us to do a standardized TPA cycle that consists of 2 Compression / Tension cycles with eventually a pause time between it. Those 2 cycles gives a **Cohesiveness** parameter based on ratio of 2 Compression phases energetic work A_2/A_1 . F_{min} value measured in first tension phase as **Adhesive force**. The **Adhesiveness** is the energetic work during the same first phase. One parameter called **Elasticity** is the ratio D_2/D_1 between the 2 distances of compression phases.

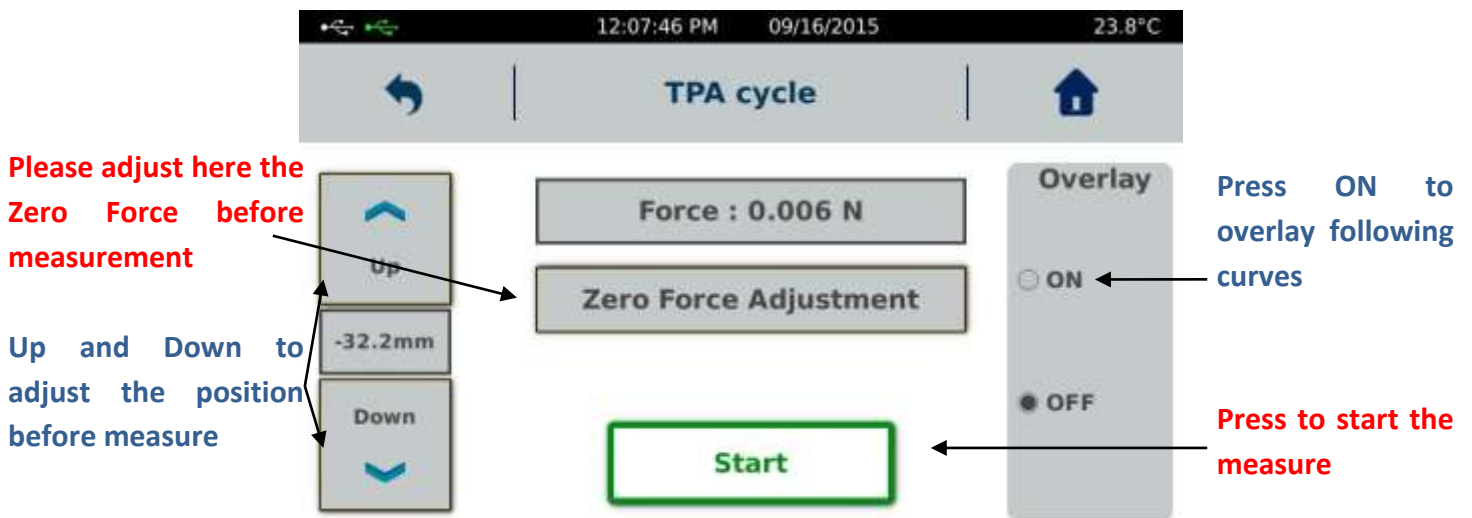
To use this mode, please select in “**TPA Cycle**” in the main menu



Select "TPA Cycle" to define one, create a method or select a previously saved method in the TX-700 memory:

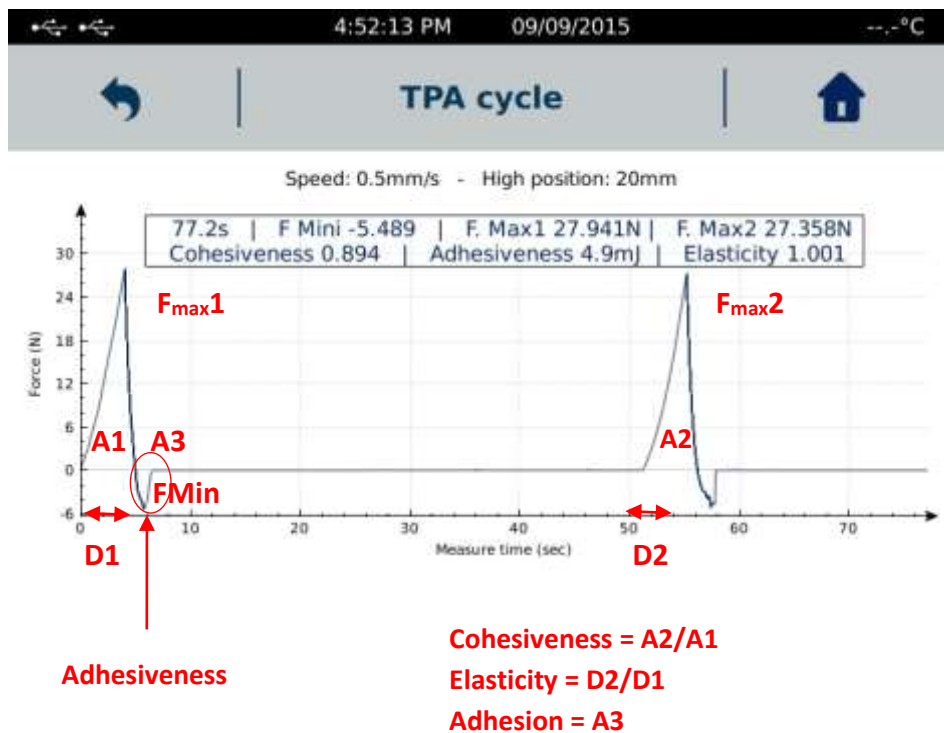


Start Measure Menu appears:



Curve and Result of Direct Compression

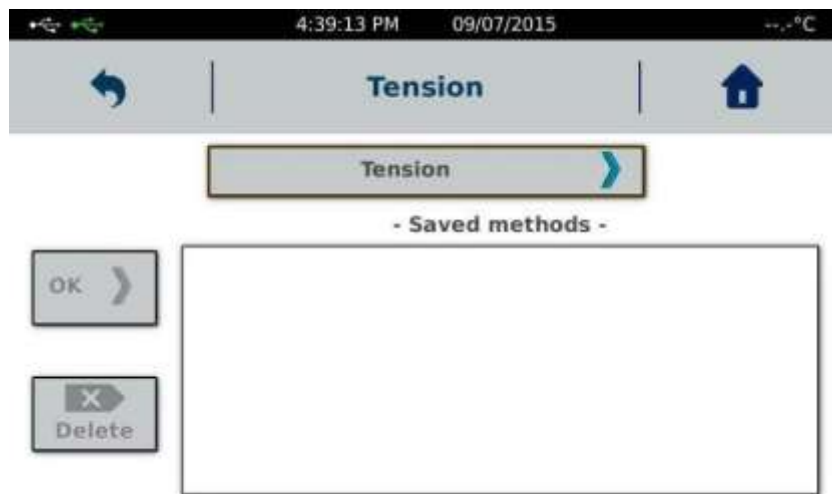
All values and the complete measuring curve are displayed as following:



5.6 Tensile test

“Tension” allow us to make a tensile test to measure the force to break a solid sample or to see the extensible power of Elastic sample. You must use one tensile grip probe and you fix the speed of tension and also the distance to do this tensile test. The Fmax force measured give either the breaking force of sample either the maximum resistance for the tensile distance (no breaking).

To do this mode, please select in Main menu Tension.



Select "Tension" to define one, creates a method or selects a method previously registered in TX-700 memory:

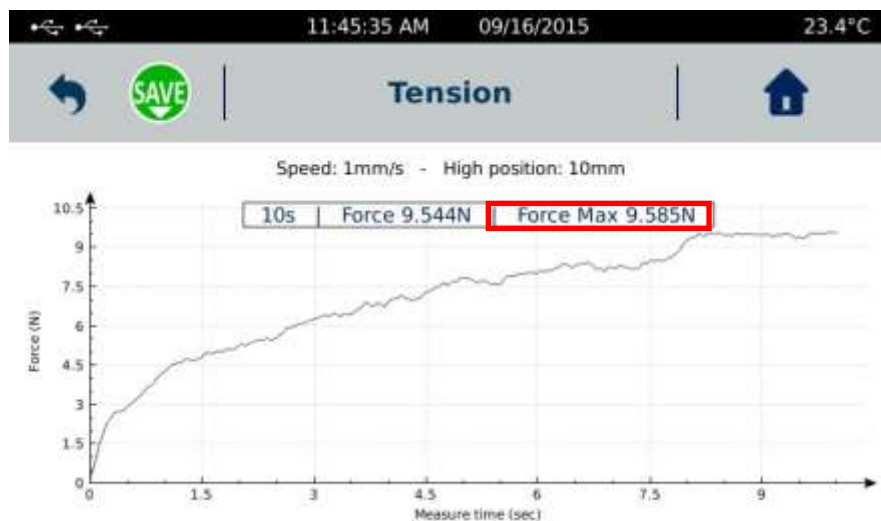


Start Measure Menu appears:



Curve and Result of Direct Compression

All values and the complete measuring curve are displayed as following:



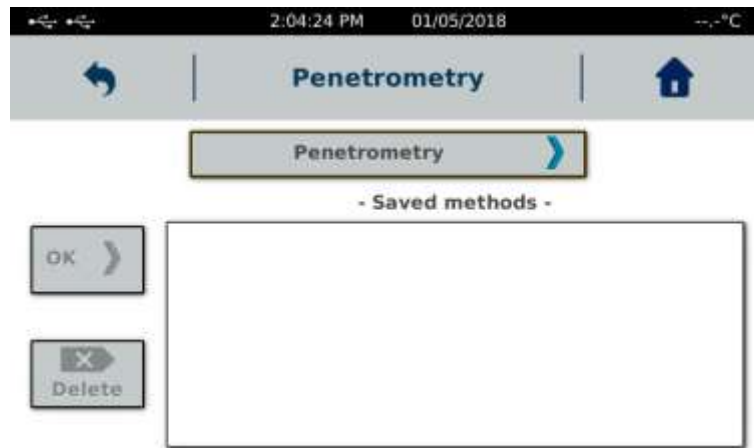
5.7 Penetrometry

“Penetrometry” test allows us to do a constant force test during a defined time. The result is the distance made by the probe inside the sample in function of its consistency.

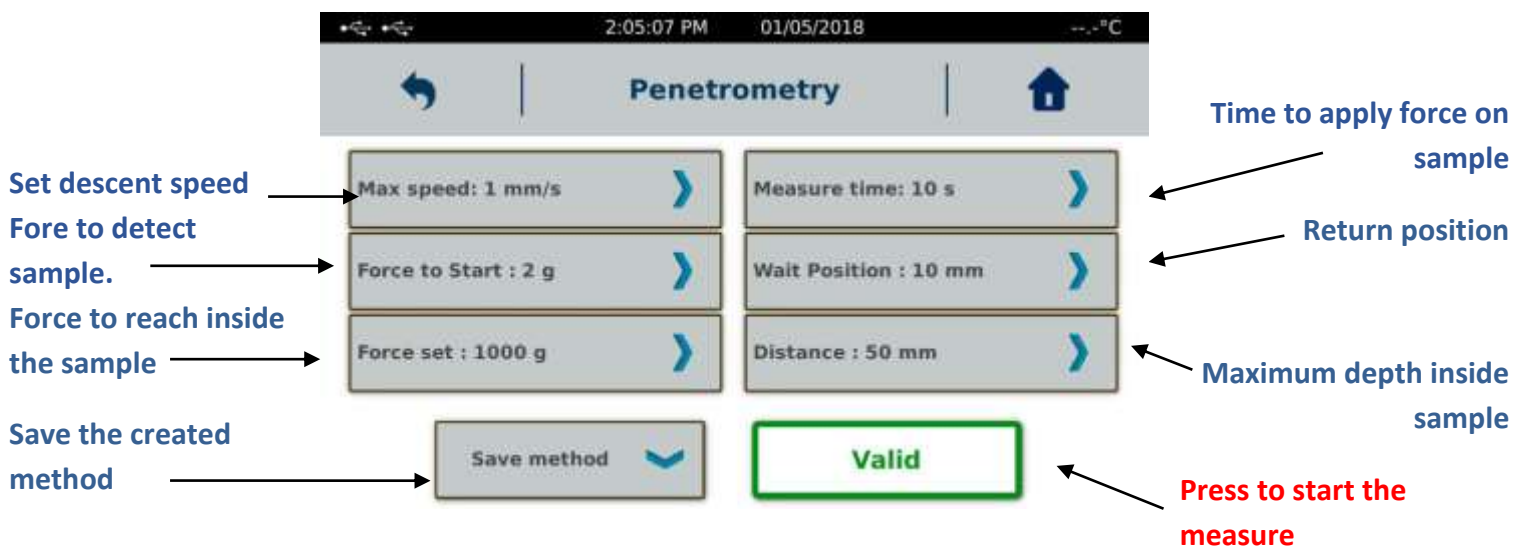
To use this mode please select « Penetrometry ».



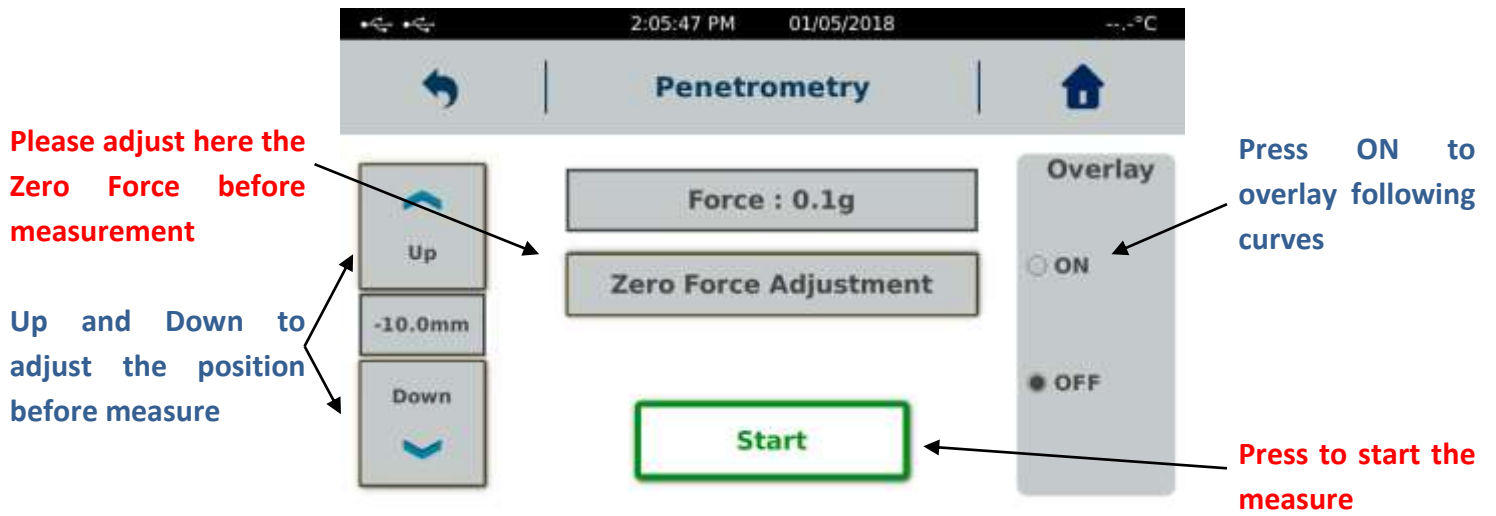
You will get this screen.



Select "Penetrometry" to create a method or select a method saved in the TX-700's memory after clicking "Ok" to edit it. You arrive on this window.

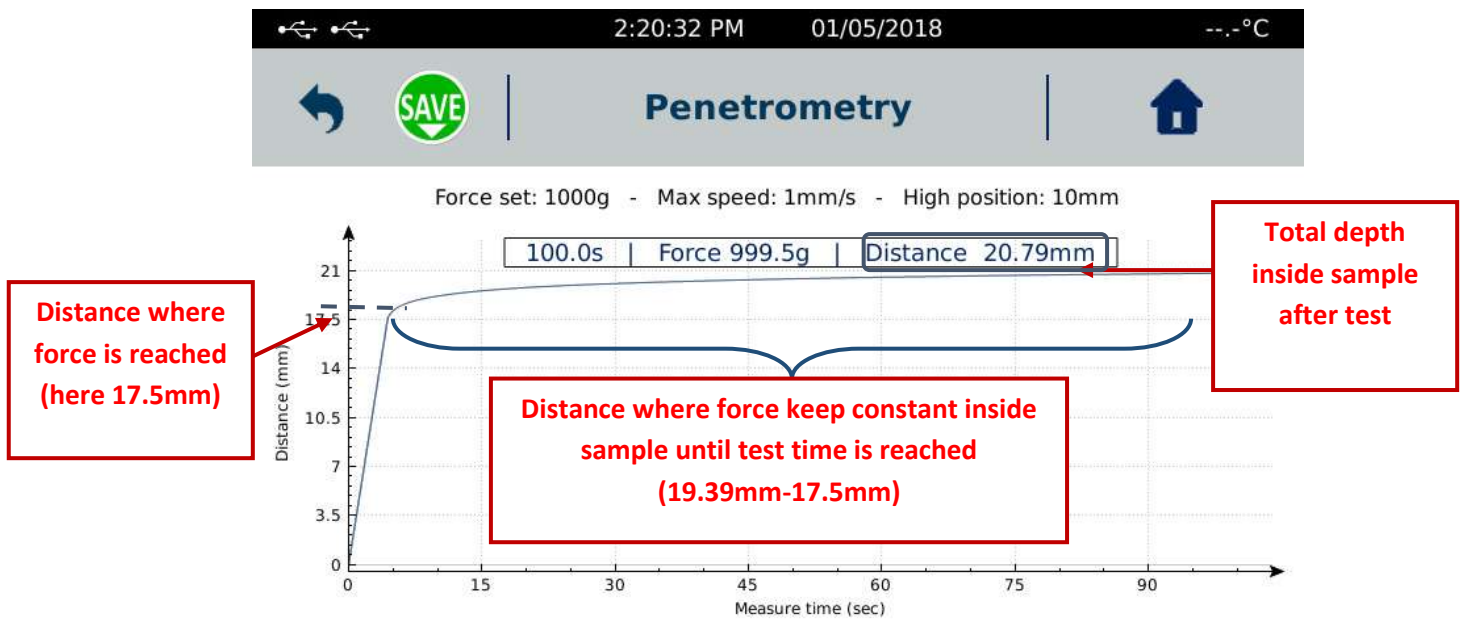


The start menu appears if you select « Valid ».



Curves and results in Penetrometry mode

All results and curves are shown like this:



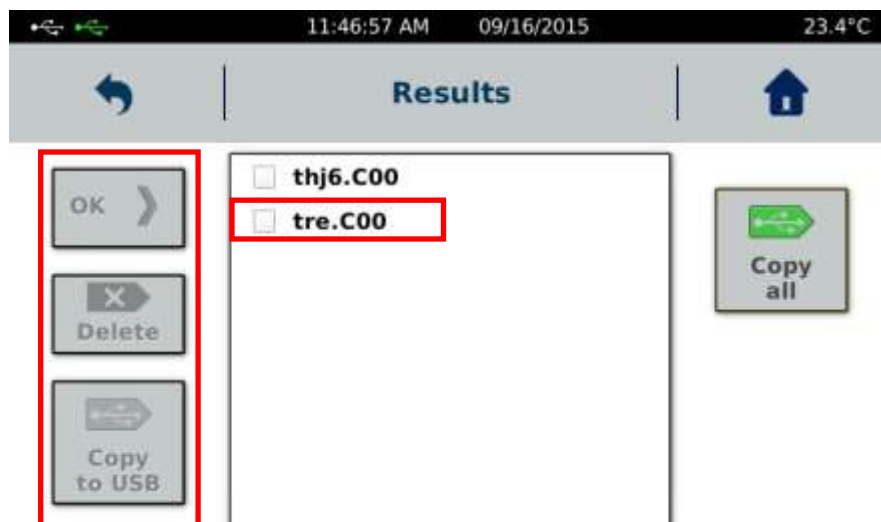
6. Results

“Results” allows you to read and export data file you saved in TX-700 memory during your measurement.

To use this mode, please select **Results** in Main menu.



The list of your data files appears. You can select your files (a cross appears near the file name) to open them with **OK**, to delete them with **Delete**, or to copy them to your USB key with **Copy**.



To export all data files saved in internal memory, connect a USB key at the right side of TX-700, then, one icon at the top of screen becomes green and “COPY All” is lighted up. You have just to press this icon to send the data file to USB stick.



7. Remote control

This Tab allows you to connect the TX-700 to a computer to be controlled by our external optional software TEX'AN DRIVE.



Connect TX-700 to computer. You must select USB or RS232 port type in function of type of communication cable you are using to



8. Parameters



On your TX-700 you can define many parameters by one click on the parameter icon on the left top of touch Screen:



8.1 Languages

To choose the languages of your device, please select **Languages** in **Parameters** Menu



Click on the language you want to select and press **OK**.



8.2 Date / Hour

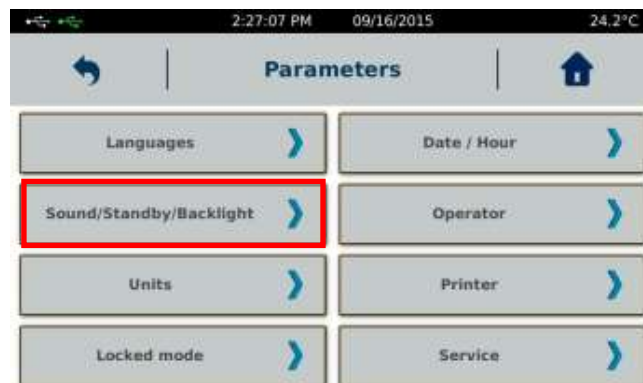
To adjust the date or time of your TX-700, please select **Date / Hour** in **Parameters** Menu



Adjust the second, minute and hour for time and day, month and year for the date, then, press **OK**.



8.3 Sounds/Stand-by/backlight



This menu enables to choose the following parameters:

Sounds: Yes => you heard a bip when you touch the screen or a buzz when a measurement is finished

Backlight => to adjust the light of screen of TX-700

Standby => to define a time to stop the screen lighting if no action is made on it.



8.4 Operator

This menu enables to create and select one Operator name:

- Creation of Operator Name with or without CODE access
- Selection of Operator Name for one user identification on measurement
- Activation or Stop of Operator Name selection.



8.4.1 Creation of user name

This mode allows you to create an operator with or without a PIN code. The first operator will be the administrator of the device (name in red). Select “Create user name with code pin” tab to implement one new user name with code identification:



Enter the User Name you want using the digital keyboard.



Enter the Password you want this new user must be enter when he want to use the TX-700.



Confirm this password.



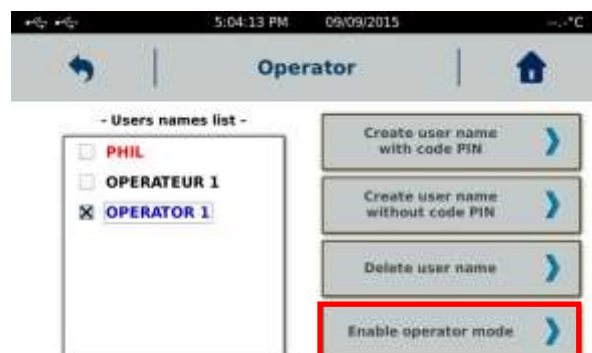
8.4.2 Selection of one user name

Select the user name you want to use. A cross indicate the user name choosed.



8.4.3 Activation of the user mode

Press "Enable Operator Mode" to activate this mode.



8.4.4 Deactivation of the operator mode

Select the user Name in **RED** and **ONLY THIS USER NAME**, and then enter its code. After this, you could press on “Disable operator mode” to deactivate this mode you want to; in order he will appear on measurement reporting.

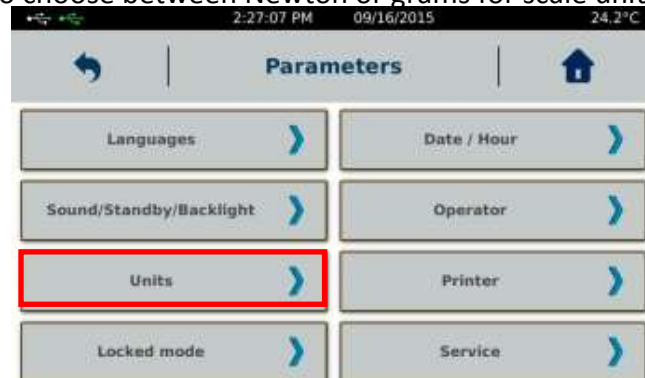
8.4.5 Identification of operator mode

The selected User Name appears on the Main Menu and also and all data of measurement. It is saved into files and also printed with results.



8.5 Units

Units menu enables to choose between Newton or grams for scale units of Force to measure



8.6 Printer

This tab enables to define the printer you want to eventually connect to TX-700 in order to print the data and curve (not on DYMO 450)



You could remove previous defined printer, valid the new one you have connected and print a test to confirm you choice. Press OK to confirm this choice before using the connected printer.

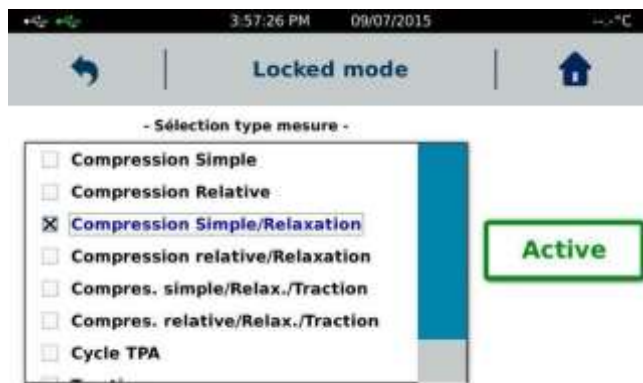


8.7 Protected mode

This parameter allows you to lock the last method made in order to avoid any change in parameters or type of measurement.



You must choose the measuring mode you want to do and select it. A cross appears beside it. You select ACTIVE tab to lock this mode with the last method you made on it.



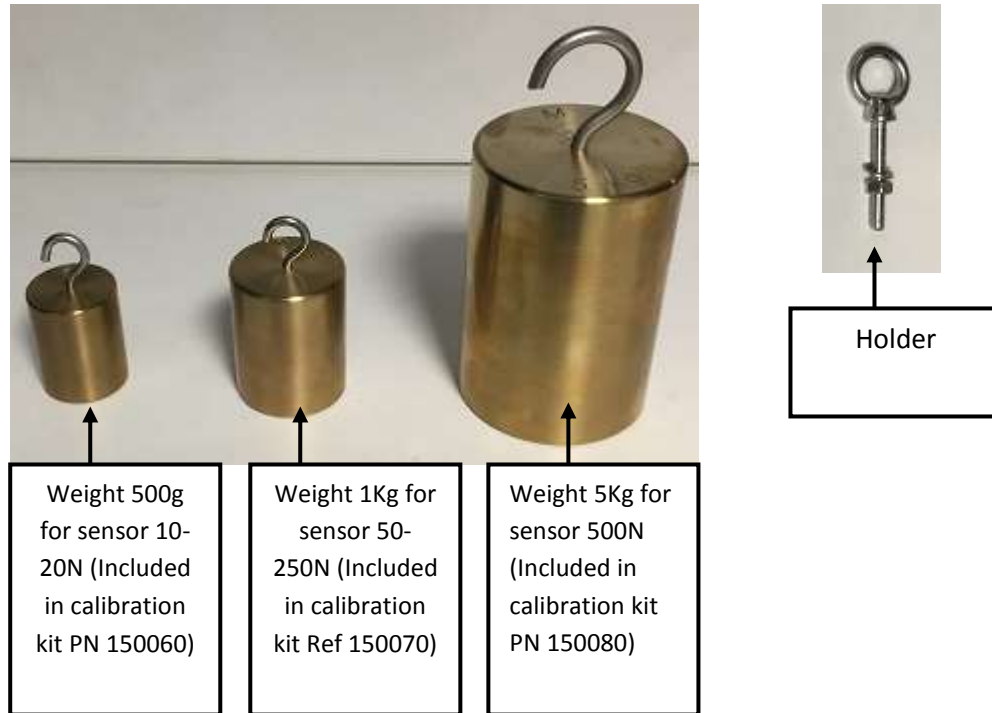
8.8 Service

This menu is exclusively reserved to the Lamy Rheology technicians or to their distributors. It allows us to go to adjustment parameters or to calibrate the instrument.



9. Verification of your instrument

The verification of the TX-700 is simple since only a certified weight is enough. LAMY RHEOLOGY offers three different calibration kits depending on the strength sensor capacity of your texture analyzer. Each comes with an holder to screw on the TX-700.



The first step is to select the gram as the unit of measure for the force (see chapter 8.5). The second step is to use the compression mode (see chapter 5.2 and 5.2.1) and to position yourself as if you wanted to make the measurement without using a registered method . Click compression as shown below.



You arrive at the window below. Choose "Direct Compression".



Once on the screen below, select "Validate" without changing any parameters since they are useless for the verification of your instrument.



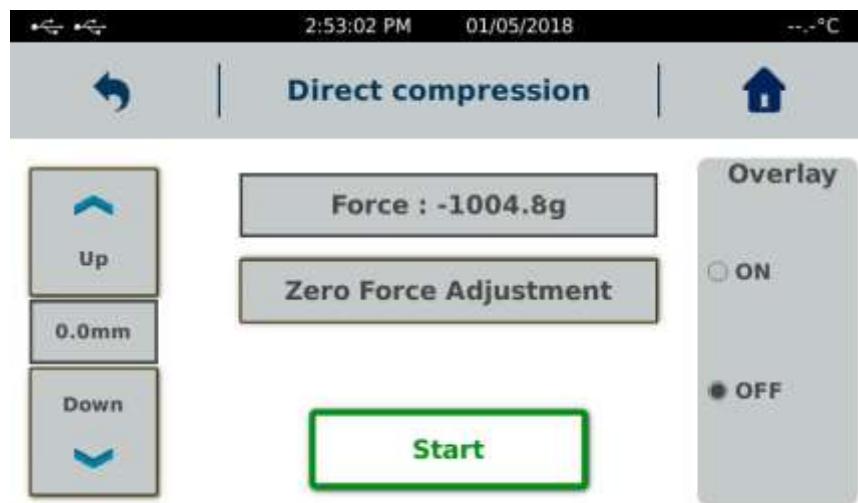
You arrive on this window (see below). Screw the holder onto the sensor and click on "Zero Force" to reset your force sensor to zero.



Now instal your weight as shown below.



Check the measured force on the screen of the device (here 1Kg as indicated on the screen below, measured with a 50N sensor). The measured force is negative since the weight "pulls" on the sensor.



The accuracy of our force sensors is 0.05% of full scale. For example, a 50N sensor (5000g or 5Kg) allows a measurement with an accuracy of 2.5g [= (0.05x5000) / 100]. For a 500N sensor, the accuracy is 25g.

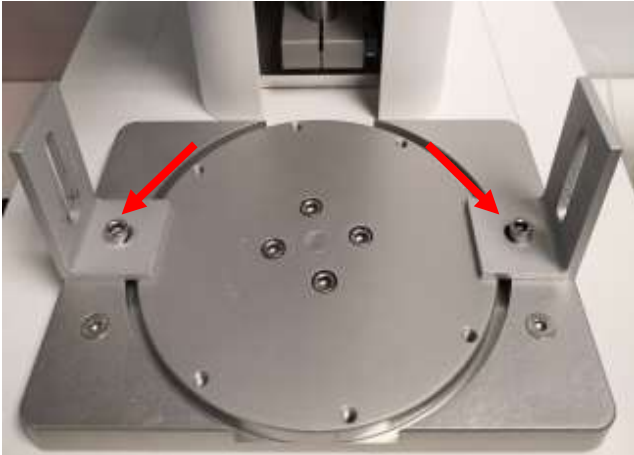
If the difference, between the value read and the weight of the weight, is greater than the accuracy of the sensor, please contact LAMY RHEOLOGY. Your device needs to be recalibrated.

10. Probes et cell installation instructions

10.1 Probes list

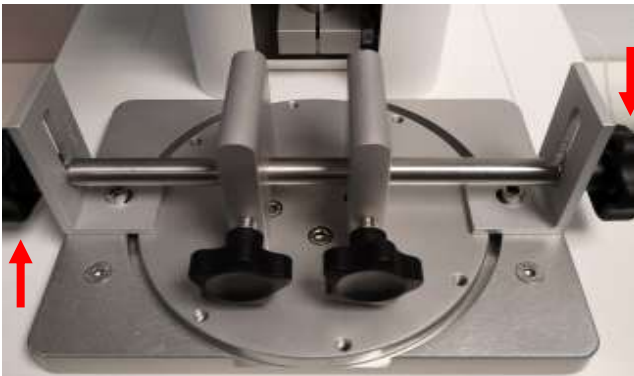
<u>Probe</u>	<u>Diameter (mm)</u>	<u>Height (mm) ou Angle (degree)</u>	<u>Reference</u>
Spherical	20	/	130149
Cleaver	25	$\alpha : 60^\circ$	130064
Dual cone	65	$\alpha_1 : 90^\circ$ $\alpha_2 : 30^\circ$	130048
Conical	25	$\alpha : 20^\circ$	130020
	30	$\alpha : 45^\circ$	130047
	30	$\alpha : 30^\circ$	121023
Cylindrical	2	35	130077
	3	35	130063
	4	35	130078
	6	35	130066
	10	40	130124
	20	40	130099
	25	40	130037
Bloom	12.7	30	130046
½ Spherical	8	/	130079
	30	/	130019
	40	/	130049
Flat	34	/	130080
	40	/	130083
	50	/	130101

10.2 « 3 points bend fixture »



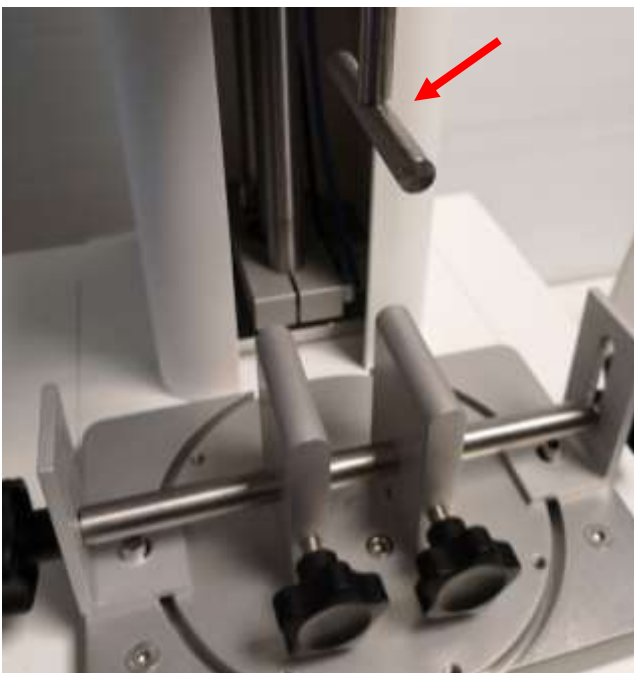
Step 1:

The turntable of the TX-700 is lowered to the minimum to prevent and interactions during the cell installation. Laterals uprights are fixed on the base by using hand screws (M6*12).



Step 2:

The horizontal fixing rod, equipped with the 2 adjustable support, is screw on the upright by using hand screws (M8*20).

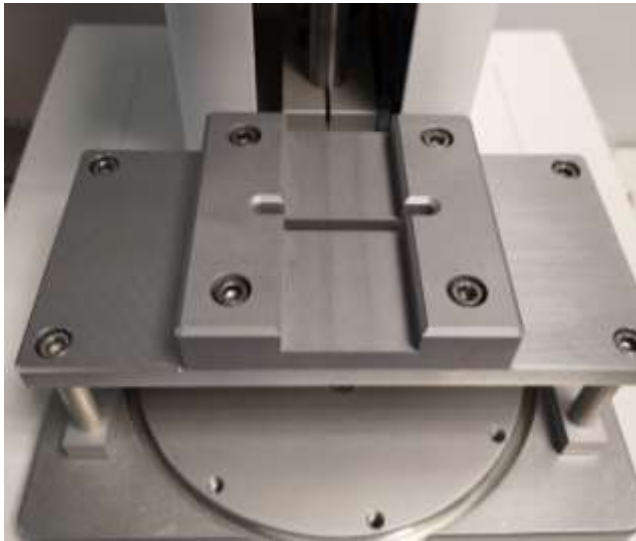


Step 3:

The sensor, fitted for the tested sample, is pull up not to interfere with the cell installation.

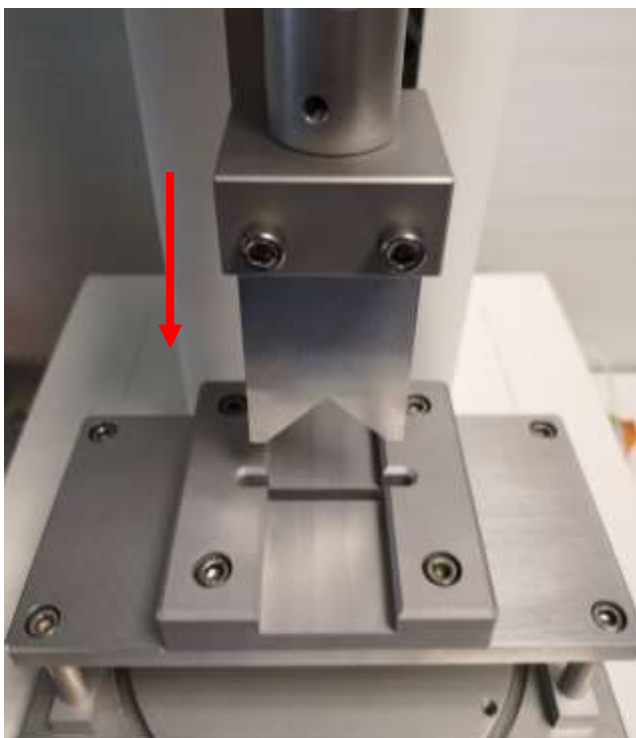
The associated probe is mounted on the sensor and align perpendicular with the tested sample.

10.3 «Warner – Bratzler cell»



Step 1:

The turntable of the TX-700 is lowered to the minimum to prevent and interactions during the cell installation. The Warner-Bratzler test bench is fixed using hand screws (M6*20).



Step 2:

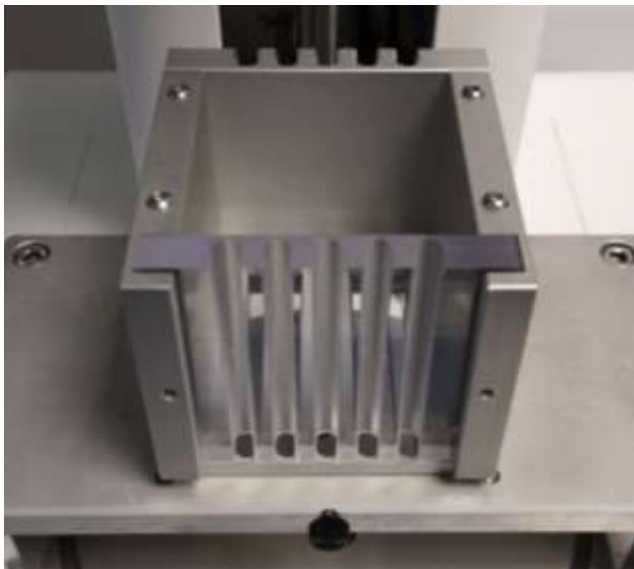
The Warner-Bratzler blade (in V shape or flat) is fixed on the adequate sensor. The proper passage of the blade in the slot is checked before the start of the measurement.

10.4 « Ottawa cell »



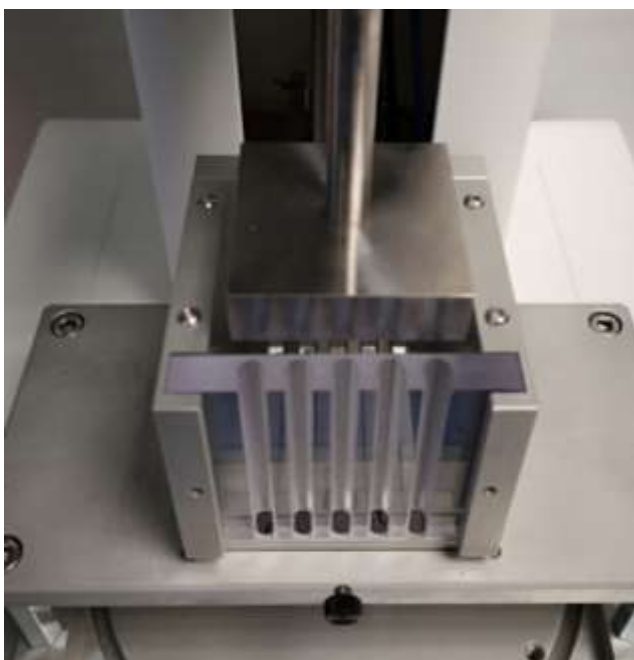
Step 1:

The turntable of the TX-700 is lowered to the minimum to prevent and interactions during the cell installation. The test bench is fixed using hand screws (M6*20).



Step 2:

The Ottawa cell (smooth inside edges) is inserted into the test bench cutout.



Step 3:

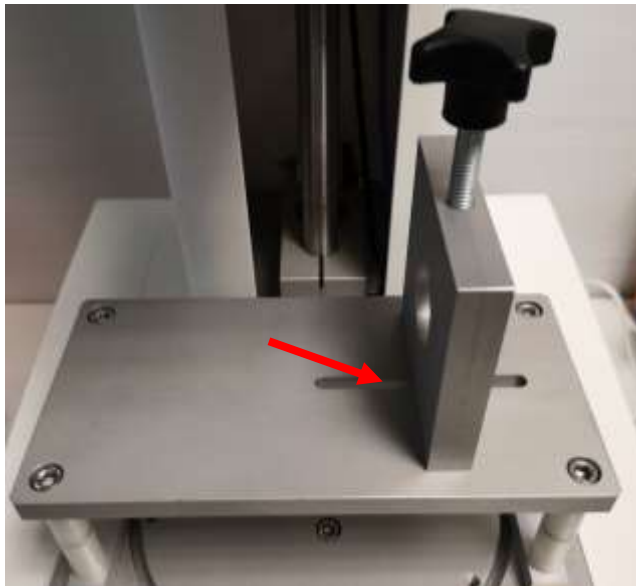
The Ottawa probe is attached to a sensor adapted to the tested sample. The correct descent of the probe is verified before the complete tightening of the 3 screws (side hand screws + small frontal screw)

10.5 « Lipstick Cantilever fixture »



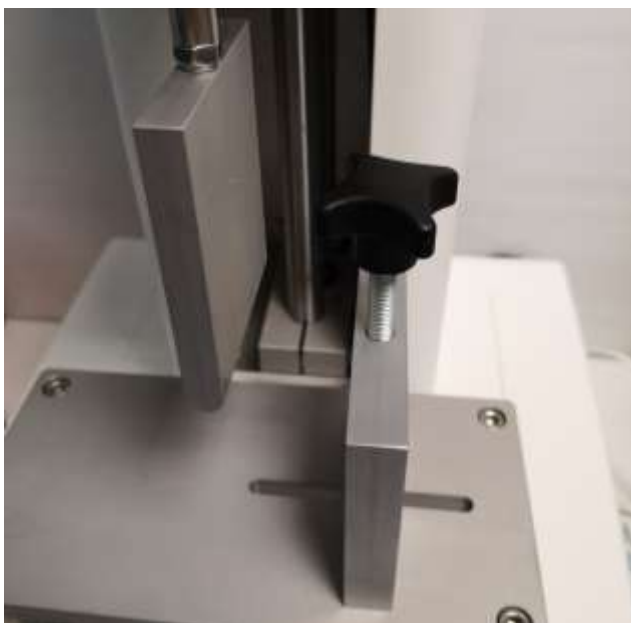
Step 1:

The turntable of the TX-700 is lowered to the minimum to prevent and interactions during the cell installation. The lipstick cantilever test bench is fixed using hand screws (M6*20).



Step 2:

The vertical mounting plate is screwed onto the bench using the lower hand screw. The slot in the test bench offers great adjustability.



Step 3:

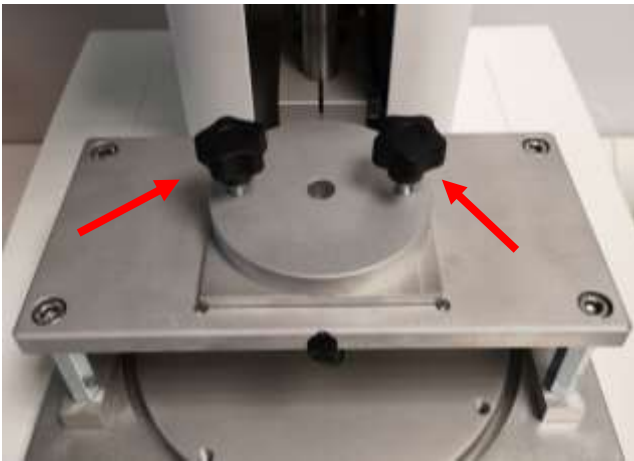
The cell associated probe is installed on the appropriate sensor. The sample is kept by the superior hand screw and adjustments can be made.

10.6 «Compression cell for film»



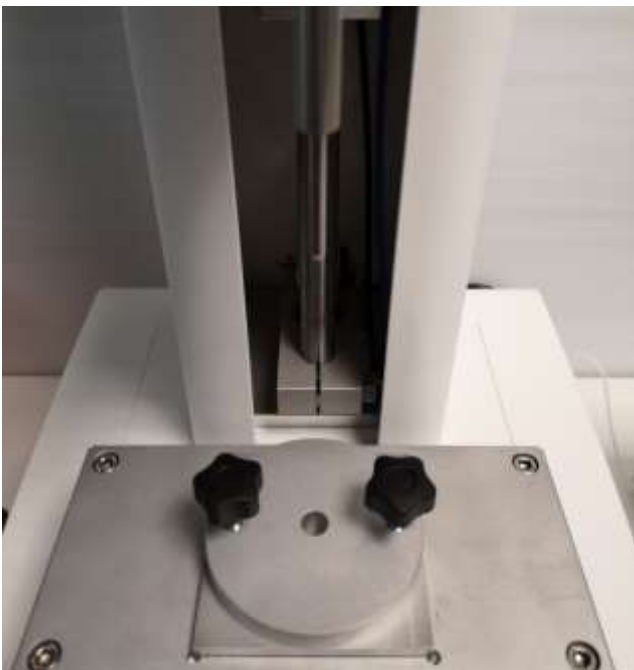
Step 1:

The turntable of the TX-700 is lowered to the minimum to prevent and interactions during the cell installation. The test bench is fixed using hand screws (M6*20).



Step 2:

The test fixture is placed on the test bench cutout. The two thumb screws hold the film in place during compression.



Step 3:

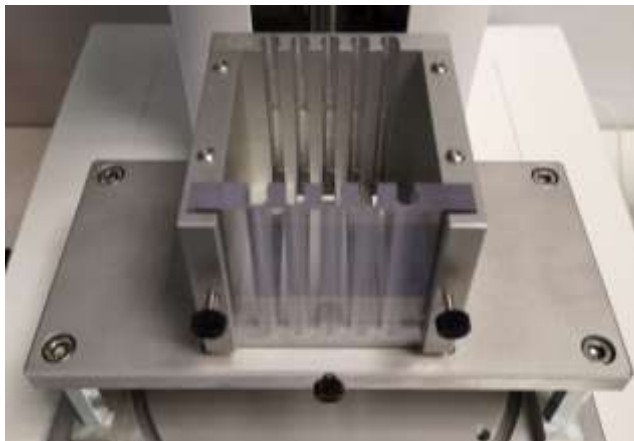
Piercing probe is installed on the sensor and the probe is correctly aligned with the cell and checked before doing the measurement.

10.7 « Kramer cell 5 blades »



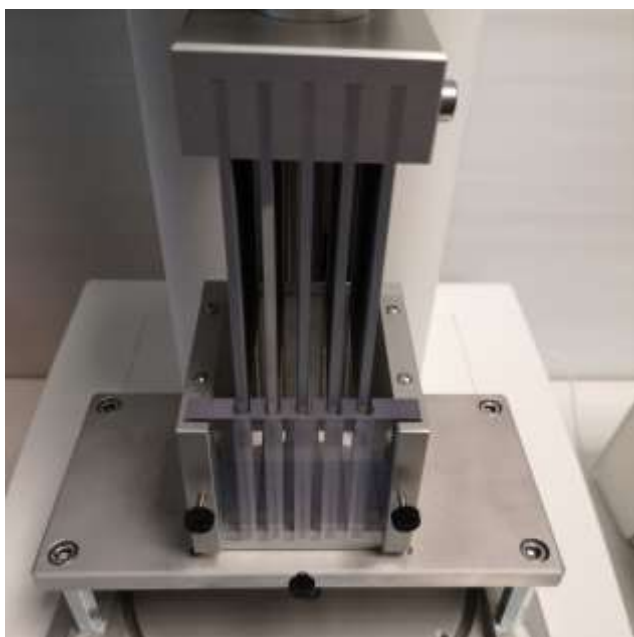
Step 1:

The turntable of the TX-700 is lowered to the minimum to prevent and interactions during the cell installation. The test bench is fixed using hand screws (M6*20).



Step 2:

Kramer cell (inner edges striated) is inserted into the cutout of the test bench.



Step 3:

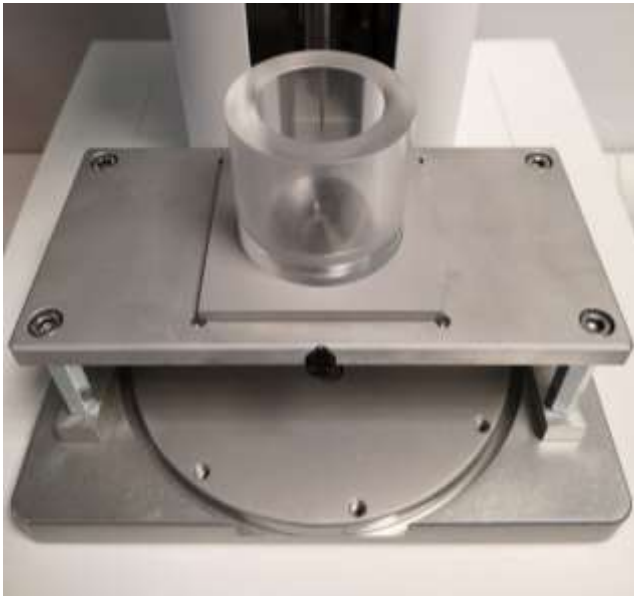
The right sensor, is pull up not to interfere during the installation of the 5-blade probe. The correct descent of the probe (without interference) in the streaks is checked before taking the measurement.

10.8 « Extrusion cell (forward and backward) »



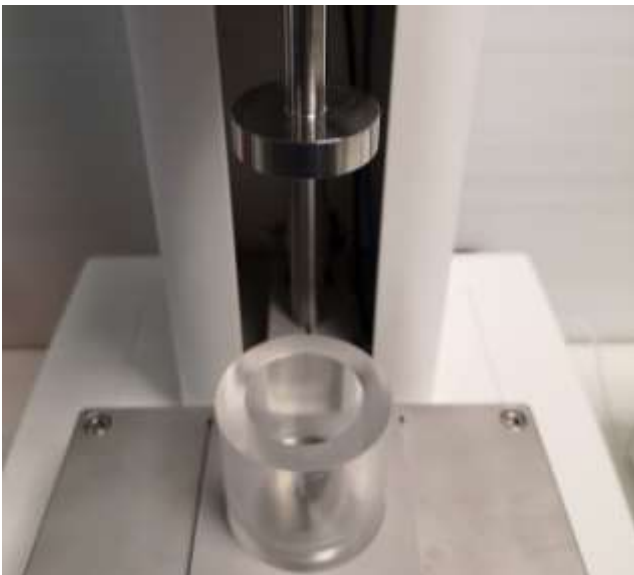
Step 1:

The turntable of the TX-700 is lowered to the minimum to prevent and interactions during the cell installation. The test bench is fixed using hand screws (M6*20).



Step 2:

The extrusion cell is placed on the test bench cutout. The screws are not tighten in order to allow a future ajustement.

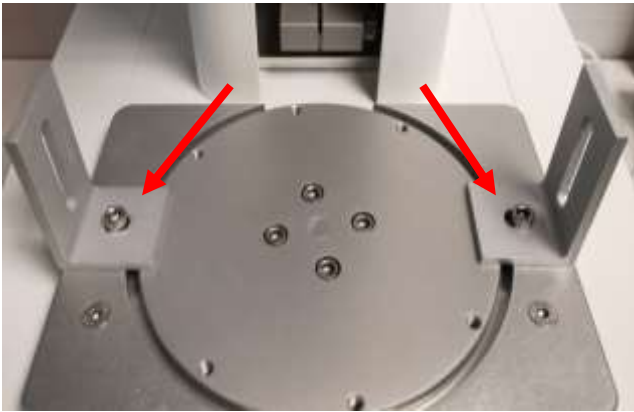


Step 3:

The probe is placed on the sensor and slowly lower so that the probe perfectly coincides with the cell. The screws are tightened once the probe is in place.

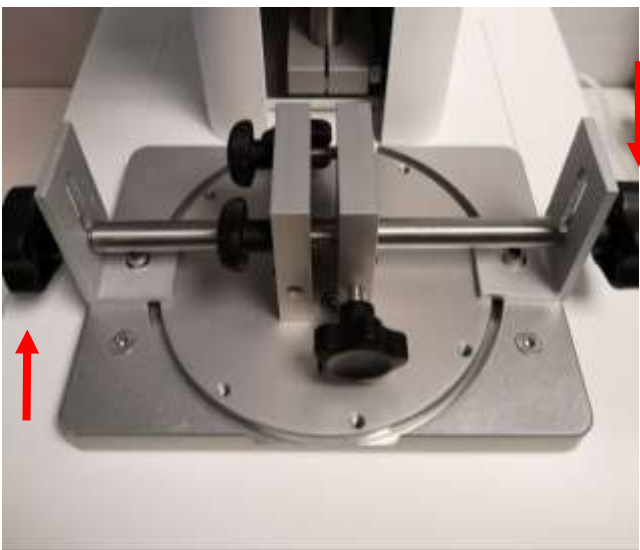
- Backward extr. : 34mm probe
- Forward extr. : 40mm probe

10.9 « Tensile test »



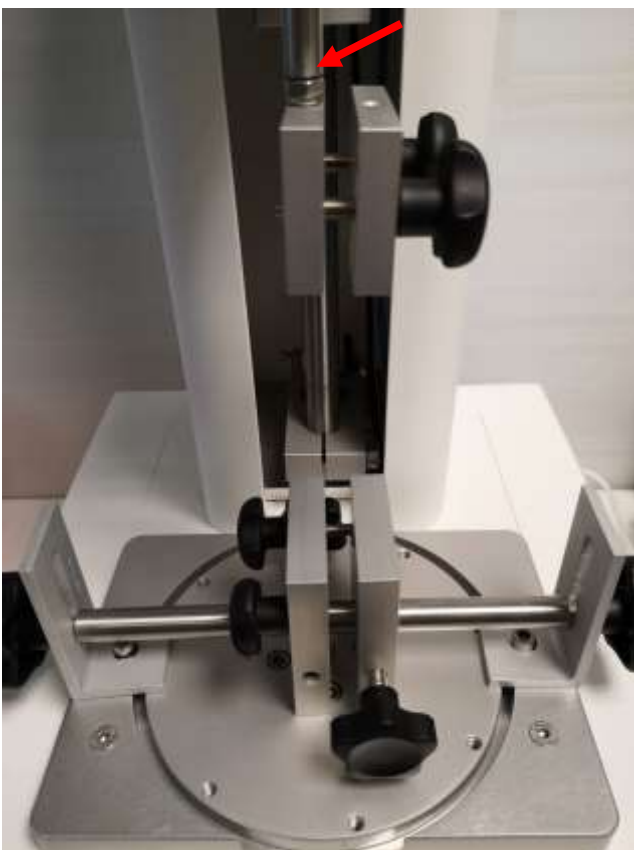
Step 1:

The turntable of the TX-700 is lowered to the minimum to prevent and interactions during the cell installation. Laterals uprights are fixed on the base by using hand screws (M6*12).



Step 2:

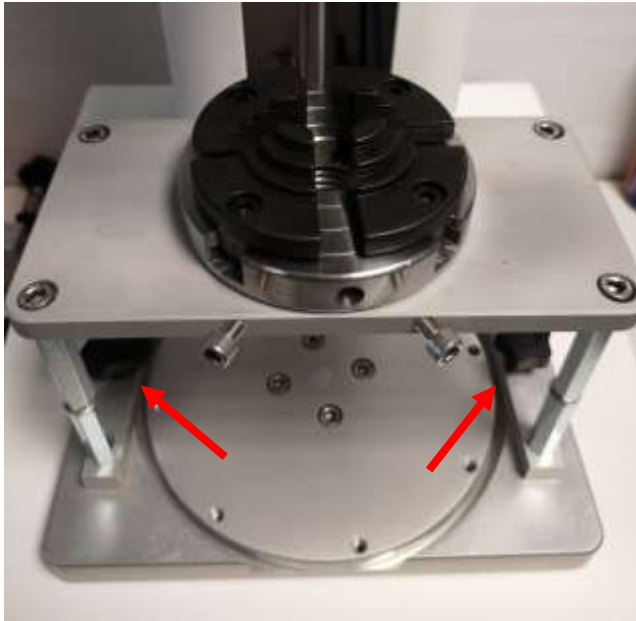
The horizontal fixing rod, equipped with the 2 adjustable traction support, is screw on the uprights by using hand screws (M8*20).



Step 3:

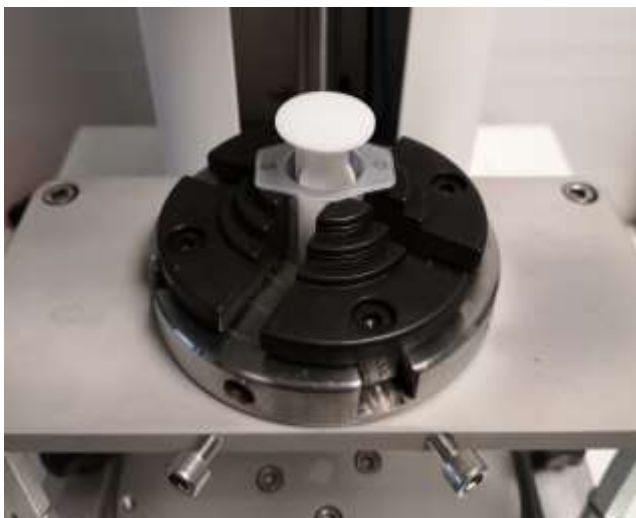
The traction sensor, associated with the appropriate sensor, is screwed onto the device. The multitude of hand screws allows optimal adjustment.

10.10 « Syringes test bench »



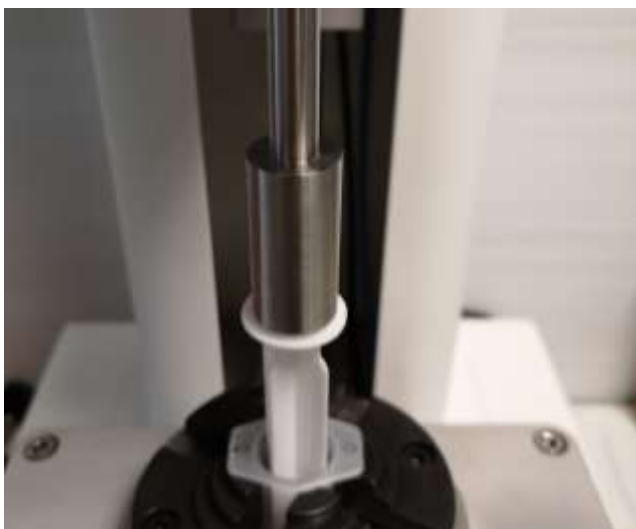
Step 1:

The turntable of the TX-700 is lowered to the minimum to prevent any interactions with the test bench. This bench is fixed to the support by using the hand screws (M6*20).



Step 2:

The syringe is inserted inside the turntable of the test bench and the test bench is adjusted to hold the syringe.



Step 3:

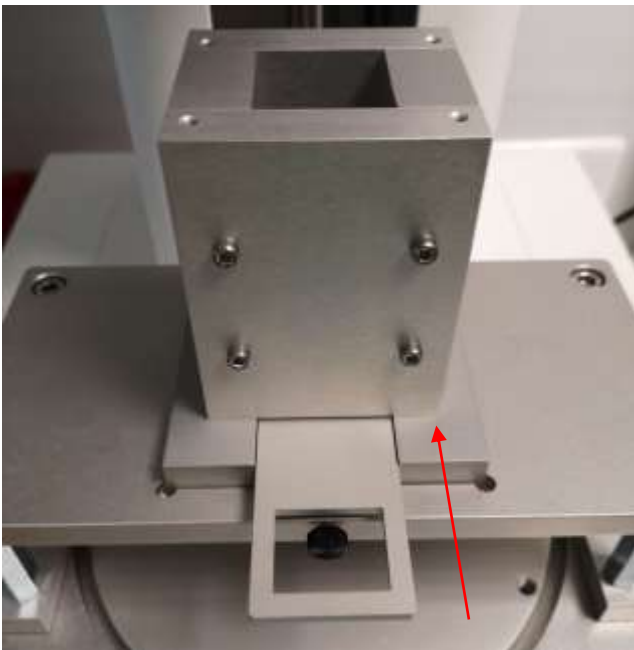
A 20mm flat probe is fixed to the sensor in order to mimic the pressure of the finger on the syringe.

10.11 « Mini Ottawa cell»



Step 1:

The turntable of the TX-700 is lowered to the minimum to prevent any interactions with the test bench. This bench is fixed to the support by using the hand screws (M6*20).



Step 2:

The mini-Ottawa cell is inserted inside the test bench cut out. The exchangeable perforate base is placed inside the cell.



Step 3:

The plunger is placed on the right sensor and the cell and the probe are aligned in order to prevent any interactions between them.

All the screws are tightened up.

11. Spécifications techniques

Type of instrument: Texture Analyser operating in Compression and Traction with 7» Touch screen

Choice of sensors:

- 10 N (1 kg), Resolution 0.001 N (0.1 g)
- 20 N (2 kg), Resolution 0.001 N (0.1 g)
- 50 N (5 kg), Resolution 0.001 N (0.1 g)
- 250 N (20 kg), Resolution 0.01 N (1 g)
- 500 N (50 kg), Resolution 0.01 N (1 g)

Accuracy: +/- 0.05 % of the full scale

Speed range: From 0.1 to 10 mm/s +/-0.2 %

Motion: Height: 240 mm / Resolution: 0.1 mm

Temperature: The TX-700 has a Pt 100 sensor to measure your sample's temperature from -50°C to +300°C

Display: Force – Speed – Distance – Temperature - Time – Level of sensitivity - Date/hour - Choice of force units: gram or Newton

Language: French/English/Russian/Spanish

Compatible accessories: All probes and cell

Supply voltage: 90-240 VAC 50/60 Hz

PC connections: RS232 Port and USB

Printer connection: USB Host Port – Compatible PCL/5

Options: Calibration kit: 10-20N (PN 150060); 50-250N (PN 150070); 500N (PN 150080); Software (PN 311005)

Dimensions and weight: D610 x W340 x H650 mm, Weight: 22 kg

CE Conformity

The following instrument: *Texture analyser TX-700*

Is approved in accordance with European directive:

Electromagnetic compatibility 2004/108/CE

Security of low voltage equipments 2006/95/CE

This conformity is insured by the respect of harmonized standards:

EN61326-1 (January 2013)

EN61010-1 (October 2010)

Date: MARCH 11rd 2015

Eric Martino



LAMY RHEOLOGY

11 A, rue des Aulnes
69410 Champagne au Mont d'Or (France)

Tél : 33 (0)4 78 08 54 06

Fax : 33 (0)4 78 08 69 44

contact@lamyrheology.com

