

Dataphysics DCAT – 25 Tensiometer



The DCAT 25 from Dataphysics is a multifunctional instrument for dynamic contact angle measuring and tension measurements. It's capable of weight-based measurement of surface and interfacial tension, dynamic contact angles, critical micelle formation concentration, and adhesive force. The DCAT 25 features a high-precision electrodynamic compensation weighing system with automatic and manual calibration, a variable speed motor for height positioning of the sample vessel. It also features automatic crash protection, automatic coupling lock for the balance, a measurement camera, and intuitive control with the TP 50 touch screen control panel.

Technical Specifications:	System Accessories:
Measuring range for surface and interfacial tensions: $1 - 2000 \frac{mN}{m}$; $\pm 0.001 mN/m$ resolution	TV 70: Liquid temperature control unit for 70mm sample vessels 70 mm with integrated Pt100 probe; LDU 25 R1: Automatic dosing and refill system
Measuring range for dynamic contact angles: $0 - 180^\circ$; $\pm 0.01^\circ$ resolution	RG 11: Du Noüy ring for surface/interfacial tension measurements
Weighing range: $10\mu g - 210g$; $\pm 10 \mu g$ resolution	PT 11: Wilhelmy plate for surface/interfacial tension measurements
Measuring value rate: up to 50 weighing values per second	PSH 11: Special sample holder for plate-shaped solids
Temperature measurement and range: -10 to $130^\circ C$ (liquid temperature control unit TV 70); room temperature to $250^\circ C$; $\pm 0.2 K$ (temperature control unit TEC 250/DCAT)	DH 25: Drop holder for adhesion measurements between droplet and solid
Integrated automatic stirrer	SP-DCAT: Support to be placed on top of TV 70 for holding samples during adhesion measurements

System of Procedures

1. Remove the cover and turn the camera and light in the position as shown

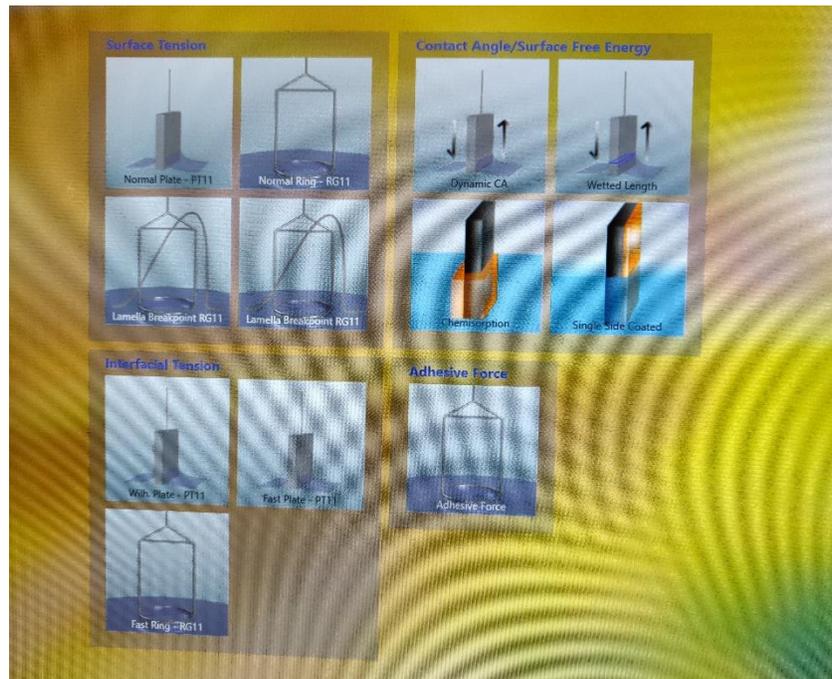


2. At the back of the DCAT-25, locate the power button and turn it on. Once on, the light should be turned on in amber color.



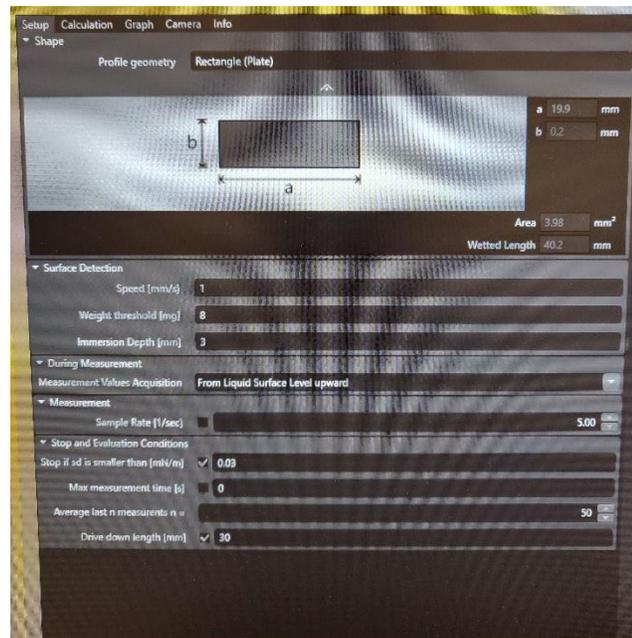
3. Turn on the system and log on to NCF user. Open DCATS-Tensiometer software from desktop shortcuts.

4. The home screen of the software contains options of which measurement to perform. Based on the requirement, select the function.

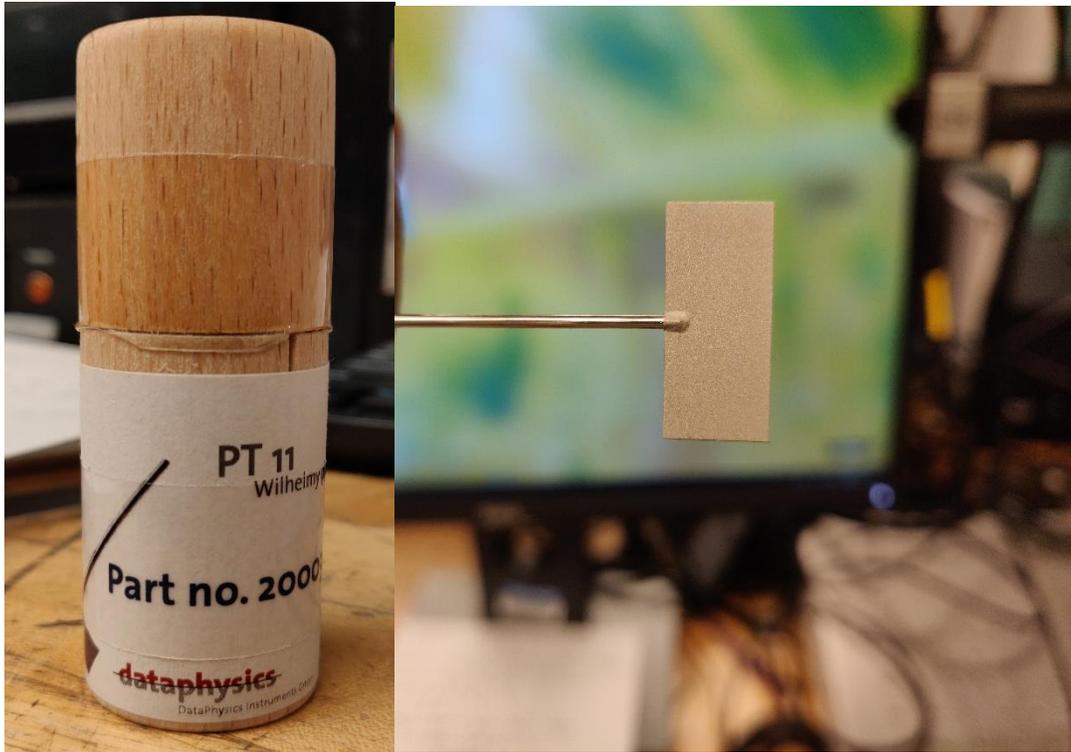


Surface Tension Measurement

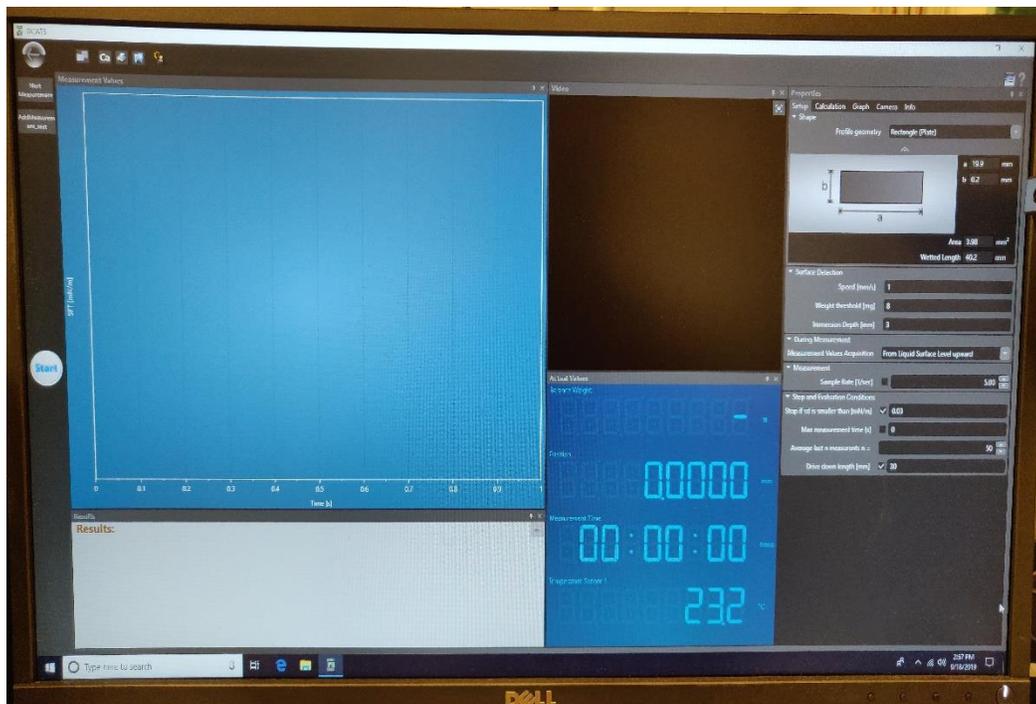
1. For surface tension measurement we select the Normal Plat PT11. On clicking, following screen will appear. Adjust parameters according to the experiment.



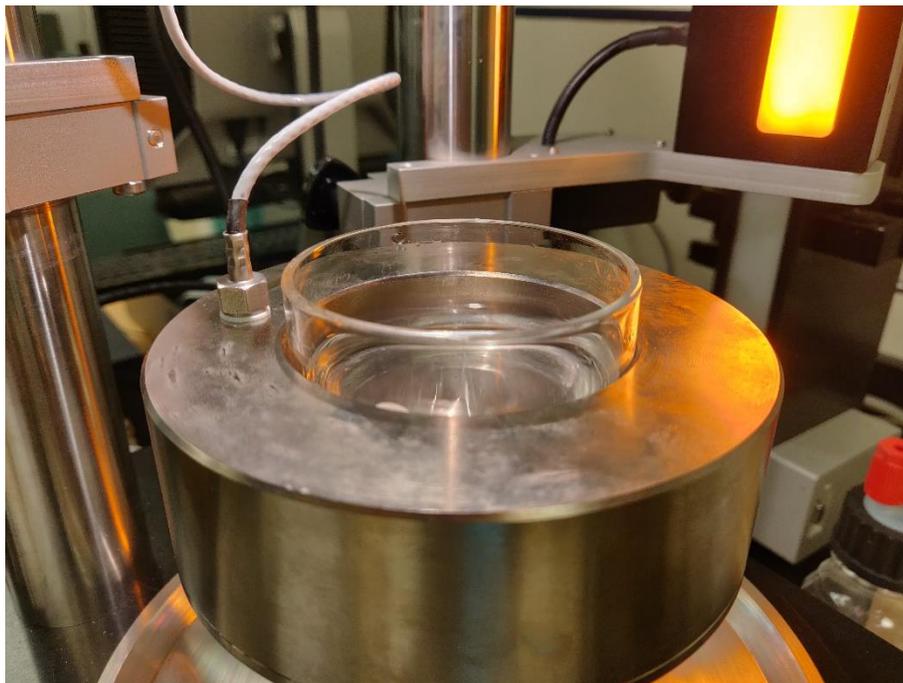
2. The tool used in this measurement is PT11. It is in the right-hand side drawer below the DCAT-25.



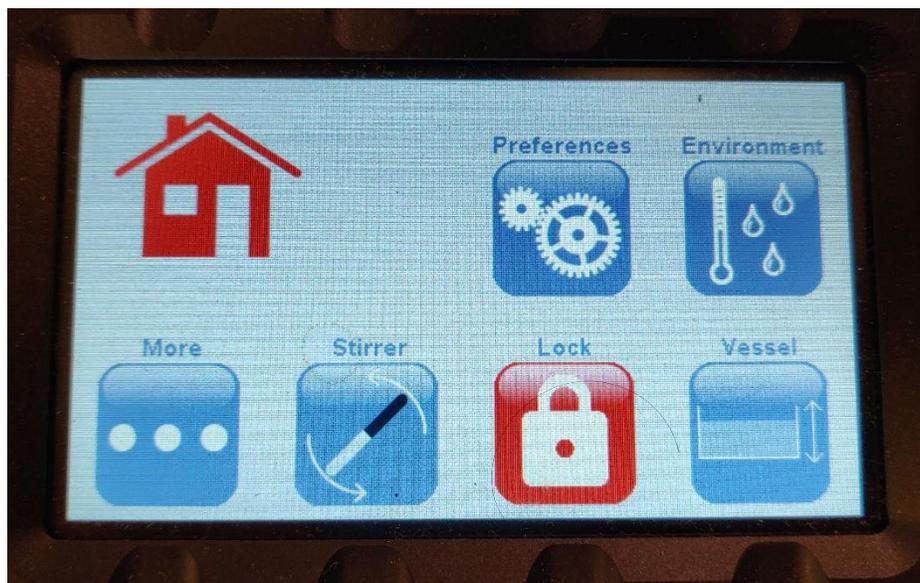
3. Once setting up the parameter is complete, click the Normal Plate PT11 icon again and the following screen will appear.



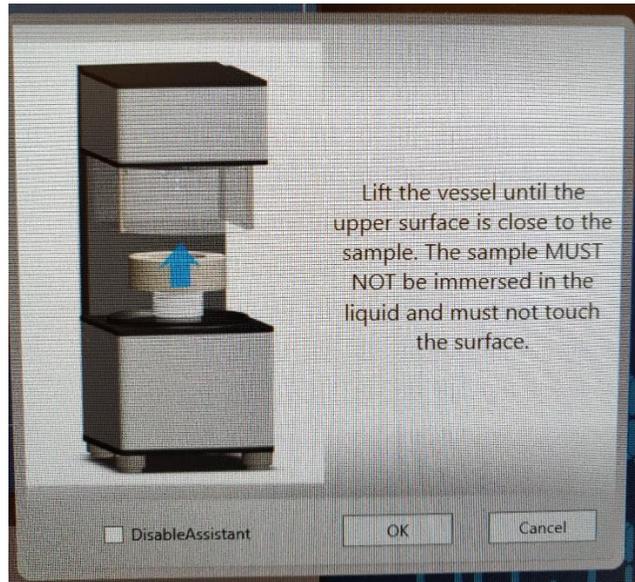
4. For the surface tension measurement, you need to fill the liquid in a beaker. For testing, we use Ethanol. Fill 3/4th and keep aside. Remove the black stage from DCAT-25 and put the beaker inside the holder.



5. From Plasma torch, clean the PT-11. The plasma torch and a lighter are in the drawer.
6. On the panel, the lock icon should be red i.e. the clamp is locked. This means that the clamp is secured. If you wish to attach or detach the tool to the clamp, it should always be in locked position. Currently, attach the tool to the clamp.



- On the software, hit start at the leftmost corner. At this point the software will prompt you to choose a location to save file. Set the location and click okay. Follow the instructions on the screen. **NOTE: Our machine does not have door. When prompted to close the door, click ok to the next instruction.**
- On following the instructions, you will be prompted to bring the stage very close to the PT11 tool. The instruction that appears on the screen is as shown:

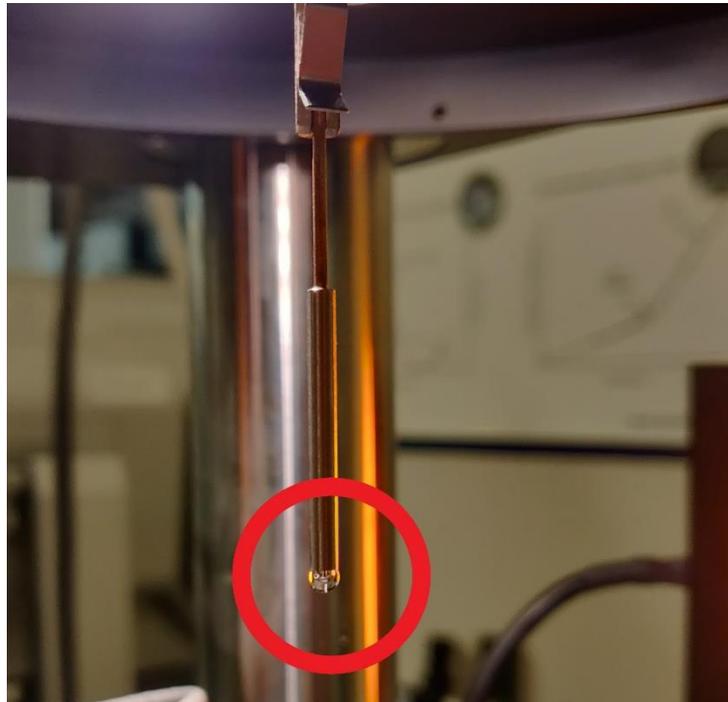


At this point, click vessel on the panel and use the rotatory dial to bring the stage up. **NOTE: Do not touch the PT11 at any point.**

- Click okay and the on the DCAT-25 starts the measurement. Once done, you should see the value on the screen.

Adhesion Measurement

- The tools required for the adhesion measurement is the tip, the aluminum plate coated with Teflon and syringe. For the measurement, put the stage back and securely mount aluminum plate on it.
- Use the tip tool and attach it to the clamp. **NOTE: The clamp should be locked while changing the tip.**
- Use the syringe to take the droplet of the liquid and place the drop on the tip as shown



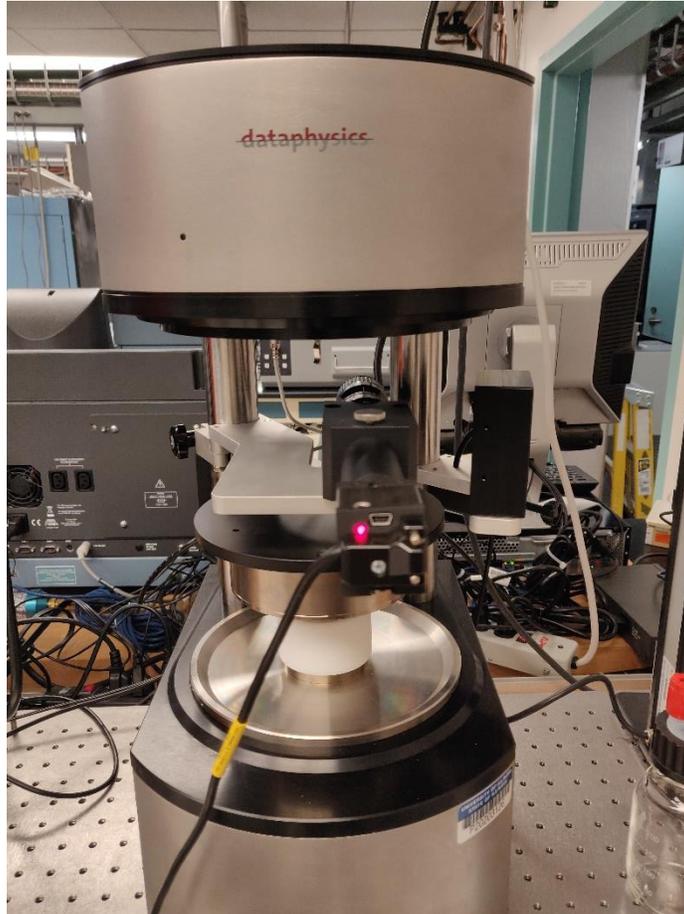
4. On the software, click adhesive force on the home screen as shown



5. Set the parameters accordingly and click adhesive force again. Click start and follow the instructions on the screen. In adhesion measurement, the camera is active. The video is also saved with the file.

Shutting Down

1. Once the measurements are complete, shut down the software by exiting all windows.
2. Remove the tool from the clamp. **NOTE: Make sure you do this when clamp is locked.**
3. Clean the tool with Ethanol and Plasma torch.
4. Switch off DCAT-25 by switching the power button at the back to off. At this point, the panel and the light should turn off.
5. Rotate the camera and the light to the inward position as shown



6. Log off PC and cover DCAT-25.