

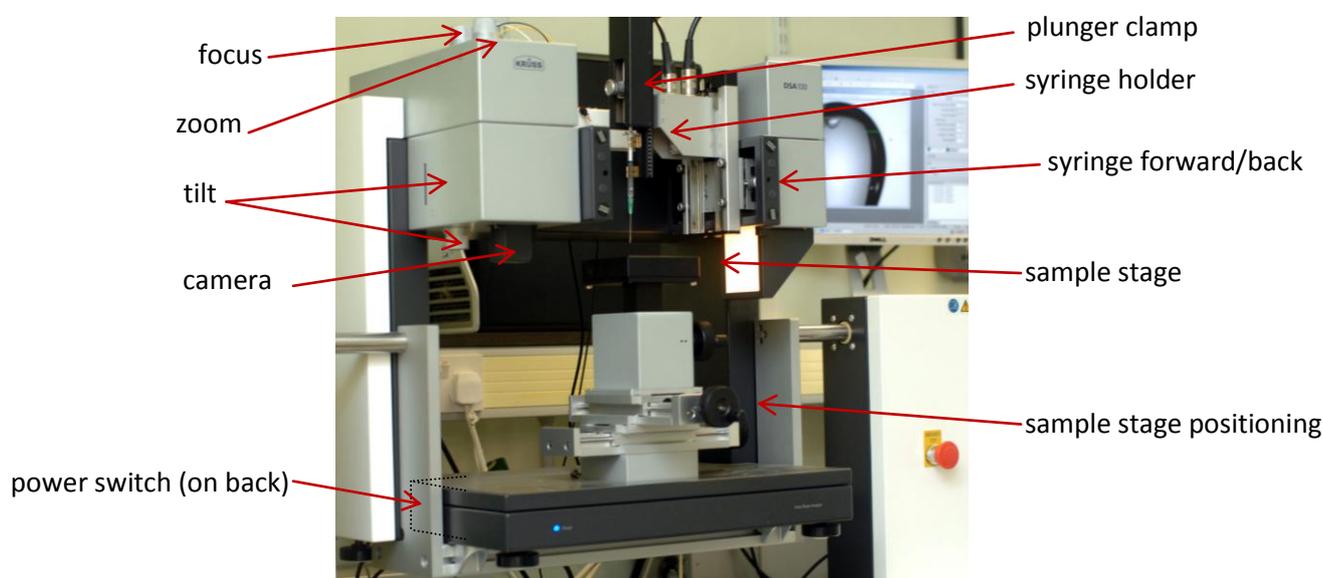
## Quick Guide to Contact Angle and Surface Tension Measurement on the Drop-shape analyser

[go.warwick.ac.uk/am2facilities/dropshapeanalyser](http://go.warwick.ac.uk/am2facilities/dropshapeanalyser)

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DSA100 manual p 54 and software manual p 22 may be useful

Location 3<sup>rd</sup> floor Chemistry, C314, door code 4009

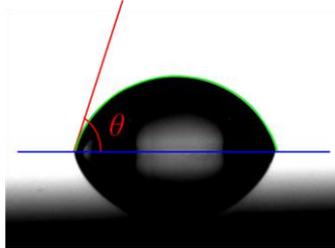


### Set up

- Turn instrument on (at the back left hand side - light will come on)
- Computer is usually left on; if not turn it on, username 'Administrator', no password
- Open software **DSA3 1.72b IEEE1394b** on the desktop
- Check the correct measurement template (MT) is active in the **MT-Explorer** tab; **CA Static** for contact angles or **PD** for surface tension. Right click on the name to set as active MT, and to edit the settings.
- Fit syringe into holder and clamp plunger in position
- Place liquid of interest in container under syringe and move syringe down or liquid up until needle is below liquid surface. Use Reset Syringe and Refill in software **CPanel -> Dosing -> Tools** to draw liquid up. Remove liquid container from stage.
- Check camera is at minimum zoom, and tilt is set to 2° (contact angle) or 0° (surface tension).
- In software, select **needle position** on the drop down menu in the middle of the page and use control + page up/page down to move the syringe until the needle comes into view
- In the dosing tab, use Manual syringe setting and adjust speed, or Volume and specify a dosing volume, then press the **▲** button until a stable drop forms on the end of the needle.

## Contact angle

- Place sample on stage and align under needle, then move up to make contact with the drop on the end of the needle, then withdraw.
- Position the sample so that the drop is in the centre of the image on screen, then zoom and focus until it is as large as possible. You may need to alter the light intensity in the **O-Con -> Illum. Intensity**. The image should show good contrast with a clear edge to the drop.



- The image can be frozen by clicking on the video camera button at the top of the window. Click again to unfreeze.
- Right-click on the image and chose **drop type -> sessile drop** and an appropriate **computation method** (see table below for guidelines).

Contact angle	Circle	Conic section (tangent 1)	Polynomial (tangent 2)	Young-Laplace
0 - 20°	√			
10 - 100°		√	√	√
100 - 180°			√	√

- **Right-click -> baseline determination**  
The baseline can be moved manually using the up/down and left/right cursors after clicking in the image
- **Right-click -> profile extraction**
- **Right-click -> computation**
- You can save the image using **right click -> save**; note that the baseline, profile, and contact angle lines are not saved with the image (print screen if you want these).

To save or export results:

- In Results-DB-Explorer open or create a new .mdb file (**File -> etc**). Go to the **results monitor** tab, right click on **current project** (ensure there is a tick in this box and in 'orphan') and select **store into DB**.
- Select or create a new workspace and save (select)
- In the database explorer tab you can change the name of your measurements if required

If you want to make further measurements:

- right click on '**current project**' select **add new measurement**
- tick box next to the new folder which has been made ('orphan-1')
- and then press the first tab to go back to the camera view and repeat measurements as above

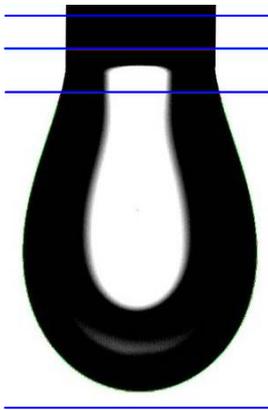
To export the data:

- Click through the levels **Results-DB-Explorer -> Workspace -> Project -> Measurement -> Values** to find your data. Click on **grid settings** to select which information to display (*e.g.* left, right and mean contact angle). **Right-click** to export as text or excel format. Phew.

## Surface Tension

Surface tension measurements follow a similar procedure to contact angles, however the absolute size of the drop must be known in this case.

- **Before you start**, use the micrometer to measure the diameter of your needle at the end.
- MT PD (pendant drop) should be active. **Right-click** to edit the settings, and go to **SDM -> Drop Deposition -> Magnification**.
- Enter the measured needle diameter in **calibration object dimensions**.
  
- Produce a drop on the end of the needle as above.
- **Right-click -> drop type -> pendant drop**. There is only one computation method available for this measurement (Laplace-Young).
- Four blue lines will appear on the image. Click and drag to move them. The first two should contain the needle end, which will be used for the magnification calibration. The third should be below the needle tip; the shape of the drop will be determined below this line. The fourth line is not used and can be placed below the drop.



- Click on the **MAG** button  to determine the magnification of the image. The value entered in the MT settings above will now be used as a calibration.
- **Right-click -> profile detection**
- **Right-click -> computation**
- Data is saved in the same way as for contact angles