

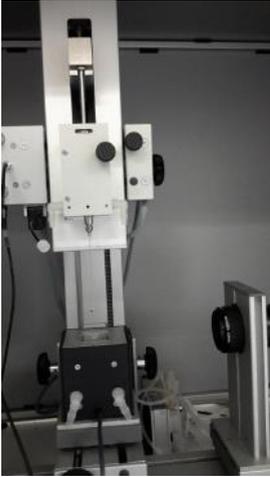
[protocol] Drop tensiometer

dinsdag 29 juli 2014 15:06

- Make a booking in the FPE equipment planner: Tracker Droptensiometer

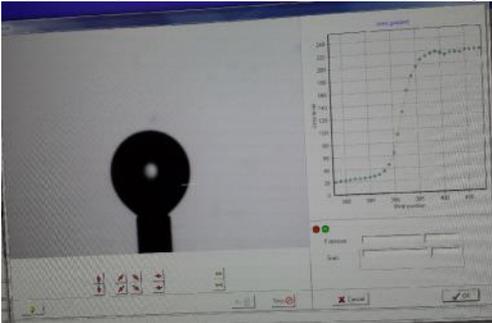
Preparation

- Turn on power of the motor
 - Turn on the waterbath
 - Start the software
 - Open an existing file
 - Make sure all equipment is clean (syringe en cuvette)
 - Fill the cuvette and install the right syringe(smaller is more precis) with the right needle (right size; J shape or I shape)
 - You can move the syringe up and down via experiment - manual motor command
 - Locate the tip of the needle in the image by turning the knobs (see picture)
- Camera image visible via: Windows - camera- 1/2
Onderste knop is links rechts in beeld
Aller rechtse knop naast camera:scherpstellen



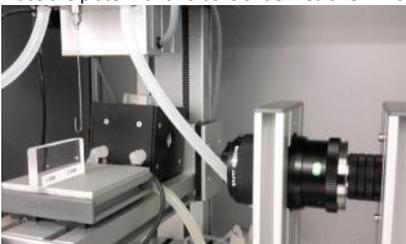
Checking /calibration that have to be done before you start:

- Workshop - Focus
To put the droplet in the focus of the camera, see picture (grey level 20 and 220)



- Experiments-one measurement
Threshold 100
Check the settings by looking at the error-graph.
This graph may not show a trend, e.g. s-curve.
- Workshop - vertical setup
Both arrows must point to 0.0 degrees

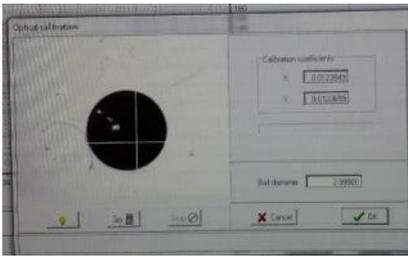
- Workshop - optical calibration
Place the plate with two bolls of defined size in front of the camera (vertical)



The extensive manual:



Determinati
on of surf...



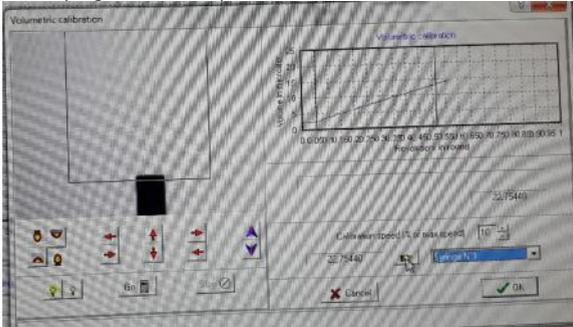
Press Go and check the given ball diameter

Workshop - Volumetric calibration

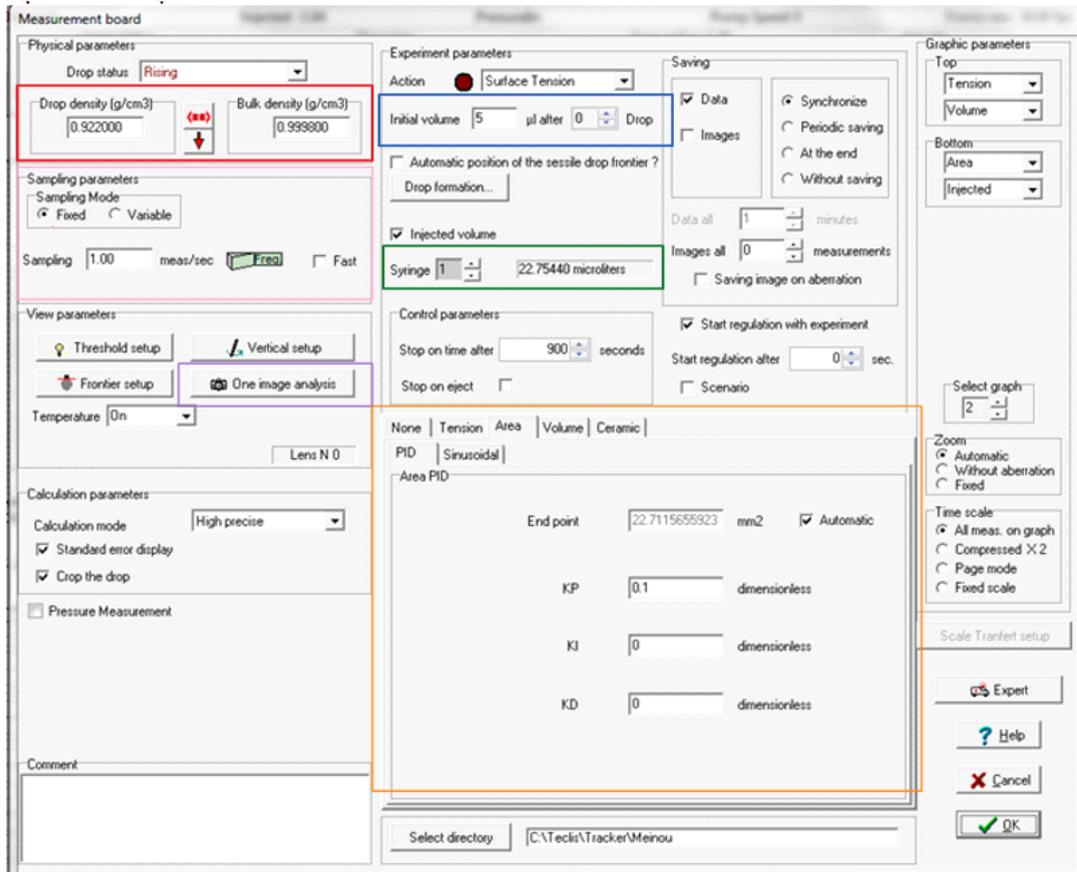
This is specific for the needle/syringe - dispersed phase combination

Make small droplet;10% and press go

Select syringe number and press hand-button



Experiments - setup Measurement:



Choose the right densities for continuous and dispersed phase

Air:0.001170

Water:0.999800

Choose the initial droplet volume

Select if you want to dispose or use the first drop.. After.. Drop

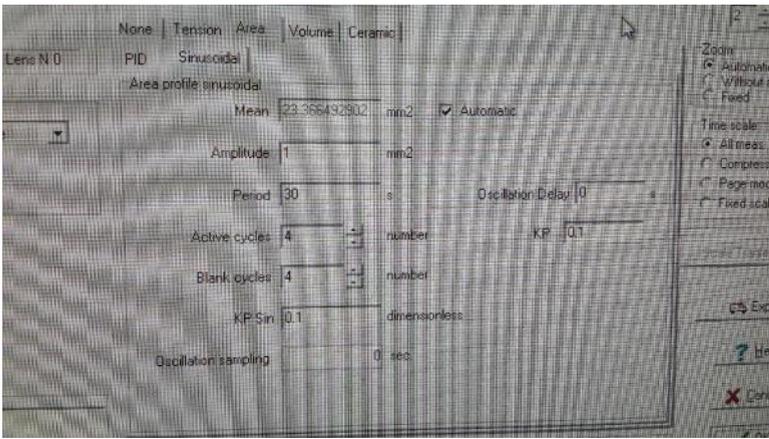
Select the right syringe (the one you just calibrated)

Choose the amount and interval of the measurements, e.g. 1 meas/sec; 600 sec

Interfacial tension experiments: Select whether you want to keep a constant area or volume.(see picture)

Constant area is recommended over keeping the volume constant (tick 'automatic' in the PID tab).

Interfacial rheology experiments: sinusoidal tab.....



Select one image analysis

Select the right locations on the image.

Move the blue solid line in the droplet and the dotted line on the border of the needle

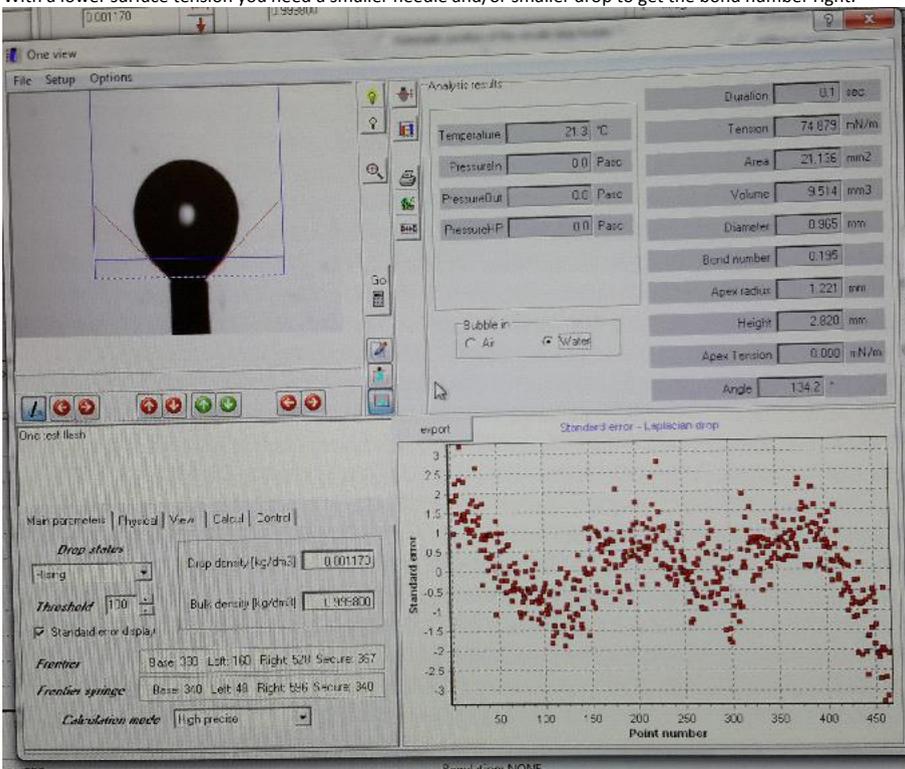
Check the settings by looking at the error-graph.

This graph may not show a trend, e.g. s-curve.

And by checking if the Bond number is above 0.1

If not, the volume of the droplet is not suitable for this needle-system combination.

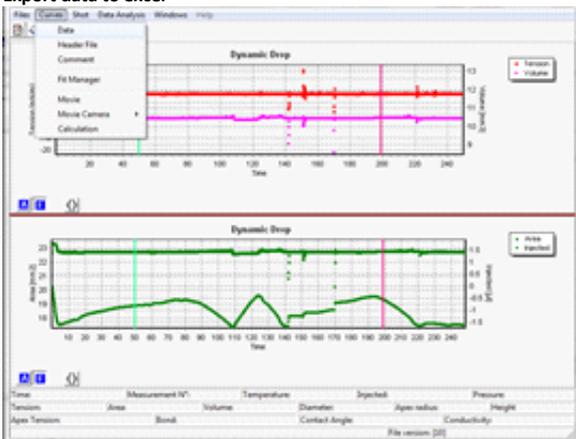
With a lower surface tension you need a smaller needle and/or smaller drop to get the bond number right.



Run measurement

1. Check if everything is in place
2. Give the measurement a name
3. Save

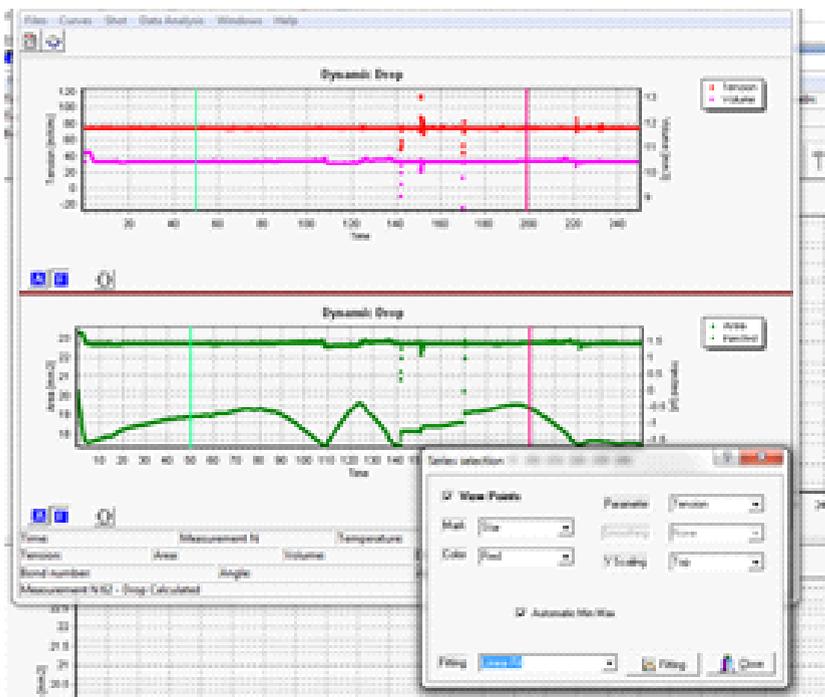
Export data to excel



#	Force	Time	Volume	Area	Perimeter	Drop radius	Angle	Left angle	Right angle	Injection	Height	Process
2	0.12	21.40	76.56	23.27	50.79	0.05	0.200375	1.26	126.67	126.67	0.00	1.05
3	0.26	21.40	76.77	23.27	50.79	0.05	0.200602	1.26	126.72	126.72	0.00	1.05
4	0.37	21.40	76.85	23.27	50.79	0.05	0.200258	1.26	126.73	126.73	0.11	1.05
5	0.46	21.40	76.90	23.27	50.79	0.05	0.210273	1.26	126.67	126.67	0.17	1.05
6	0.54	21.76	76.91	23.27	50.79	0.05	0.209508	1.26	126.85	126.85	0.25	1.05
7	0.79	21.76	76.84	23.27	50.79	0.05	0.206276	1.26	126.72	126.72	0.28	1.05
8	0.87	21.76	76.84	23.27	50.79	0.05	0.209895	1.26	126.94	126.94	0.34	1.05
9	0.90	21.76	76.17	23.28	50.79	0.05	0.210326	1.26	126.86	126.86	0.35	1.05
10	1.00	21.76	76.81	23.27	50.79	0.05	0.208871	1.26	126.80	126.80	0.45	1.05
11	1.17	21.76	76.77	23.26	50.79	0.05	0.208916	1.26	126.85	126.85	0.51	1.05
12	1.25	21.76	76.81	23.27	50.79	0.05	0.209875	1.26	126.85	126.85	0.56	1.05
13	1.30	21.76	76.77	23.27	50.79	0.05	0.209833	1.26	126.74	126.74	0.62	1.05
14	1.40	21.76	76.82	23.27	50.79	0.05	0.208522	1.26	126.71	126.71	0.67	1.05
15	1.44	21.76	76.81	23.26	50.79	0.05	0.208506	1.26	126.69	126.69	0.70	1.05

Equilibrium surface tension value

1. If the graph is not open: File-open-select file
2. Click close to the y-axis
3. Choose linear fit
4. Select the lower limit (green vertical line) and upper limit (red vertical line) in which you want to measure the surface tension
5. Press Fitting
6. Machine calculates the average surface tension and standard deviation between these boundaries.



Cleaning

Take the syringe and cuvette out and empty them both. Rinse both with tap water first.

Syringe:

1. Remove the oil with ethanol
2. Rinse with 0.1-1 g/L SDS solution (or <http://www.sigmaaldrich.com/catalog/product/fluka/z805939?lang=en®ion=NL> ?)
3. Rinse with a lot tap water (>10 times)
4. Rinse with milliQ (3-5 times)
5. Rinse with ethanol and let it evaporate before the next use

Cuvette:

1. Soak in 0.1-1 g/L SDS solution, carefully clean with small brush (or <http://www.sigmaaldrich.com/catalog/product/fluka/z805939?lang=en®ion=NL> ?)
2. Place it in the sink under running demi water, to rinse with the bubbles
3. Rinse with milliQ (3 times)
4. Rinse with ethanol and let it evaporate before the next use

Be careful:

- Don't clean the cuvette with hot water because it is heat sensitive.
- In case of protein, don't use hot water at all to prevent denaturation
- Make sure there are no detergents left on the materials
- etc