

PART 2

OWNER'S MANUAL GUIDE FOR

VISIODROP AND WINDROP++

SOFTWARE

V 1.1

1 - Installation of the software

The instrument has been delivered with a CD-ROM. Put it in the CD or DVD reader. You can find a file named Digidrop_CD_ROM.

1/ Explore it and you can find a file named **Drivers**. Click on Pixelink_Capture_OEM. This software will install the drivers of your USB video camera. During the installation, accept and activate all the options once requested.. At the completion, a shortcut Pixelink will be installed on the desktop of your computer.

2/ Find **Software installation**. Explore it and click on disk 1. Find the file **Setup**. Click on it. The software starts the installation in your computer. The default installation is C:/Digidrop.

3/ Find file CartevideoDII. Explore it . Renamed the file named CartevideoDIIUSB.dll in CartevideoDII.dll and copy in C:/Digidrop. If the file has been

0 – Main Functions of the software

0-1 Image and video files



fig.1

The principle of this instrument is based on a video camera to display measures. With the video camera, it can grab photos and videos

Once the droplet is placed on the substrate, you can :

Either save an image by **Video - Save Image** if the the static is of interest for you.

Either save a sequence by **Video - Save the sequence** if the dynamic is more useful for your study. [Cf fig.1]

Shortcuts are available.

Click on **Vidéo**, and you will see all the possibilities available to save an image or a sequence. The file *.ima and *.seq are native file and must be saved for further reference.

If you need assistance from GBX, only *.ima and *.seq must be sent to your GBX software engineer support.

After **Vidéo - Save the sequence** a new window is displayed [Cf fig.2] In this window, you can select the range of images to be selected and the size on the hard-disk occupied by these images will change accordingly.

Once you have clicked on **Record** a standard window will open to invite the user to save the file .

It is highly recommended to convert the file *.avi in Mpeg4 file by buying a CODEC either from GBX or from Internet.

A shortcut is available to save this sequence



fig.2

You can copy what you are seeing on the screen of the computer either by [Video - Copy image](#) or by using the available shortcut



0-2 Control of the video and the image.

Buttons to help the operator of the Digidrop to handle images and sequences are supplied

Below the main menu [fig3]



fig.3

Explanation of icons



Live Mode. You can see what the video camera grabs. You will use this button after the action of the photo button to unfreeze the image.



Photo Mode. To record the image you are seeing.



To record manually a sequence..



To go to the image T=0s of a sequence



Reward a sequence image after image manually .



Reward automatically



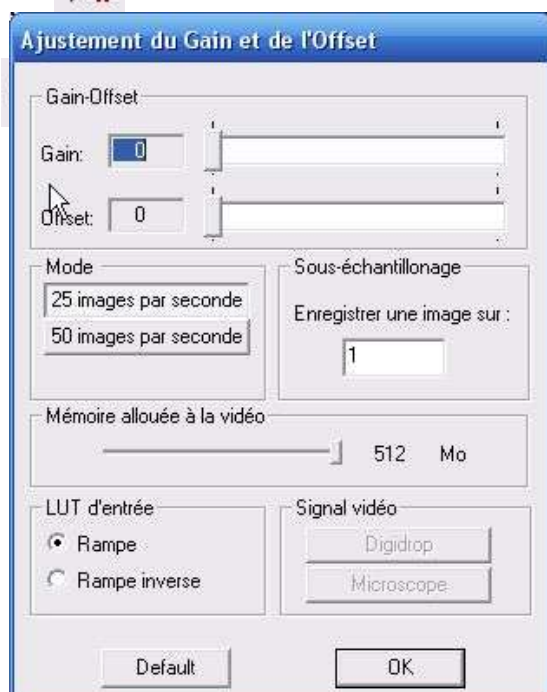
Pause



Forward the image automatically

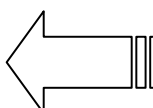


To go to the last image



When you forward a sequence manually you can select the number of images for one step

By clicking on this button the following window appears [fig 4]



To manually control the Gain (Intensity) and the Offset (Contrast)

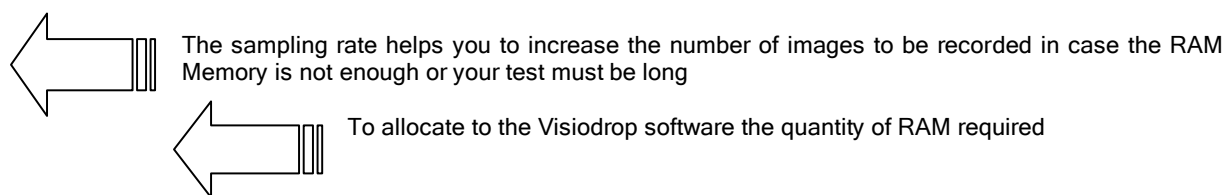


fig.4

All modifications of the memory allocation or of the sampling rate influences the data of your sequence

Exemple

N° 17	Temps: 640.0 ms	Durée: 140 images / 5.560 sec
-------	-----------------	-------------------------------

From this display, one can deduct :

- 1/ the image displayed on the screen is # 17 and was taken at the time 640 ms.
- 2/ I have recorded 140 frames
- 3/ The recording time is 5,560 s

0-3 The recording frame

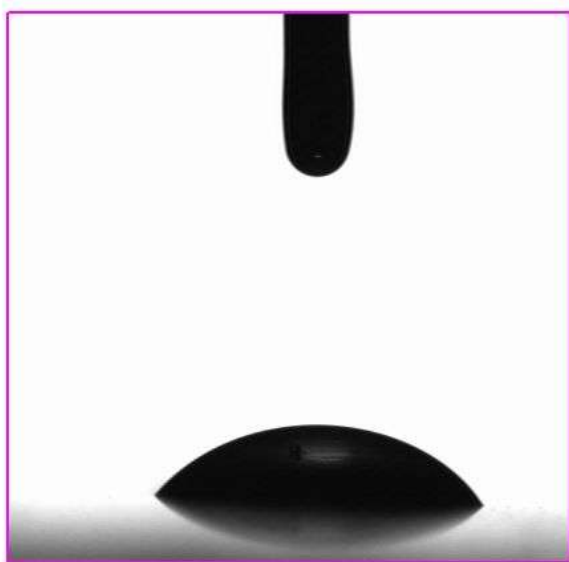


fig.5

In live mode the frame is blue and pink [fig 5] when you read a sequence

Place the frame with the mouse so that

- 1 /the needle is not inside the frame
- 2/ the recording time is the one you expect
- 3 / Other droplets are not included inside the frame.

Info : Date, hour and time are recorded for each image.

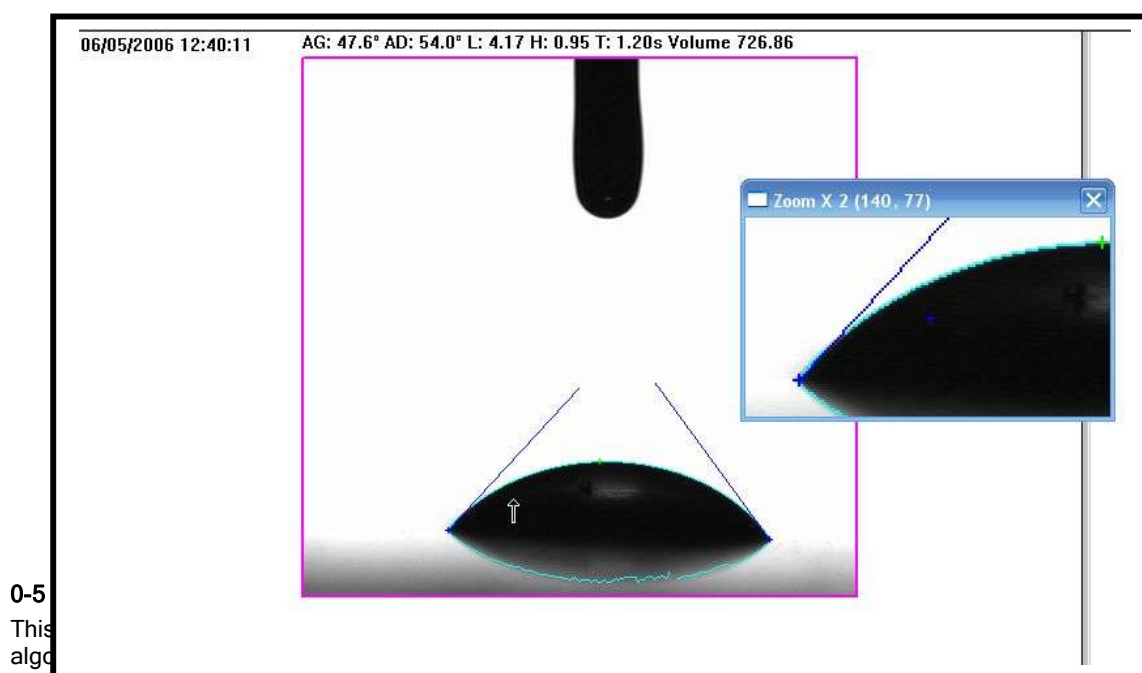
0-4 Digital

Zoom

You can get access either by [View - Zoom](#) or by using a shortcut



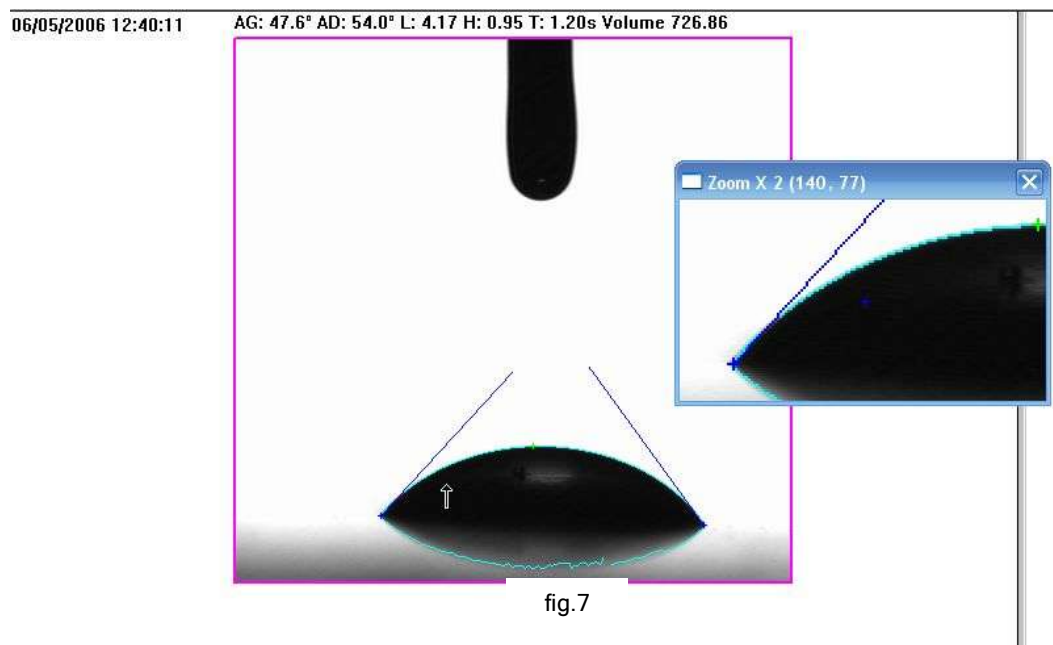
The toggle of the mouse can be used to modify the magnification of the digital zoom [fig 6]



To activate it : [View-Focus Assistance](#)

fig.6

Place the frame around the needle and adjust both blue lines to be on the needle [fig 7]. By adjusting the button of focus you will see that the 2 numbers are changing. The right number must be as higher as possible and the left one the closer as possible of the right one. At least it must be the blue moving line must be at the right of the red limit



0-6 Volume Estimation

To activate it : [View - Volume estimation](#)

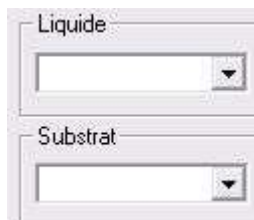
This fonction helps the user in displaying the volume of his liquid with a discrepancy of 0.1 μ l
Once activated, the value is displayed at the left of the screen

0-7 Calibration of Pixel

To activate it : [View- Calibration](#)

This information is important to understand the accuracy of your measures in Volume, height and base line.
If the pixel is about 10 μm , this mean that the accuracy must be the overall accuracy should be around $\pm 10\mu\text{m}$.

0-8 Data base of liquids and solids



A list of liquids can be selected easily from the database. When you input a name of a substrate this name will be saved with the name of the file only.

0-9 Contact angles algorithms



This part can solve the analyse of all the shapes of the droplet you should meet during your experiences.

Manual 1 : for the manual determination of the contact angle by using the method $\pi/2$

To complete a measure :

- 1/ Place the cross on the left edge point of the droplet
- 2/ While you are keeping the left part of the mouse pressed move the cross up to the right edge of the droplet (activate the digital zoom, this will help you for sure)
- 3/ As soon as the right point has been reached release the mouse and press again without moving your hand
- 4/ Move the cross up to the top of the droplet
- 5 / Release the mouse and click on Manual 1. The measure will be displayed

Manual 2 : Similar to Manual 1 except the assistance on the base line

To use the Manual 2 your sample must be flat.

Once you have selected the left edge point, the software will oblige the operator to select the other point on the horizontal line

9/2 : The display of all the 3 points will be automatic

Contour : Once activated the shape of the droplet will be analysed and measured to calculate the contact angle. This mode is not filtered

Contour 90 : Same as above but only for angles equal or above 90°

Fixed Base : Same as contour mode but the base line can be selected by the user

Method :

- 1/activate zoom digital
- 2/ place the cross on the left edge point of the droplet
- 3/ While you are keeping the left part of the mouse pressed move the cross up to the right edge of the droplet
- 4/. Release the mouse and click on Fixed Base
- 5/ The measure is displayed

Polynomial : This method is very accurate and display the tangents. He is highly filtered so the time of measure is longer

In wetting hysteresis menu, the Polynomial algorithm is a little bit different. It will work only if the needle is inside of the droplet.

Captive Bubble : This algorithm needs a specific kit with a dedicated menu .

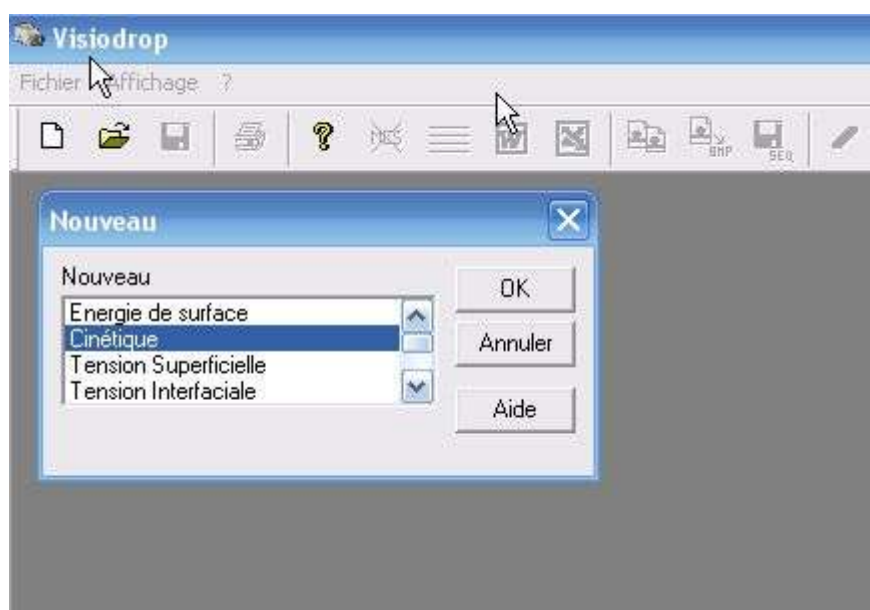
Curved substrate:For the automatic determination of the contact angle of curved substrates

1 Kinetic menu

1-1 Open the menu

This menu is used to work on porous surfaces or when the liquid spreads on the surface

To open it, , select **File - New**, a window appears. In the mini window activate **Kinétique** Menu



1-2 Results table

N°	Liquide	Substrat	A. G.	A. D.	Larg.	Haut.	Vol	Aire	V/A	Temps	Mode
----	---------	----------	-------	-------	-------	-------	-----	------	-----	-------	------

The table will display the left and right angle, the width and the height of the droplet together with the volume and area. The ratio Volume/Area is also calculated

Before starting your measure you must load a sequence [fig 8]



Fig 8

You must not forget to enter the name of the liquid and of the substrate. Otherwise the following window will appear



1-3 A measure in the Kinetic Menu

D'abord calibrer votre pixel, car cette procédure va vous permettre d'obtenir des mesures précises sur la hauteur, volume et aire de la goutte

Follow the following procedure . Select [Measure - Calibration height-Width](#)

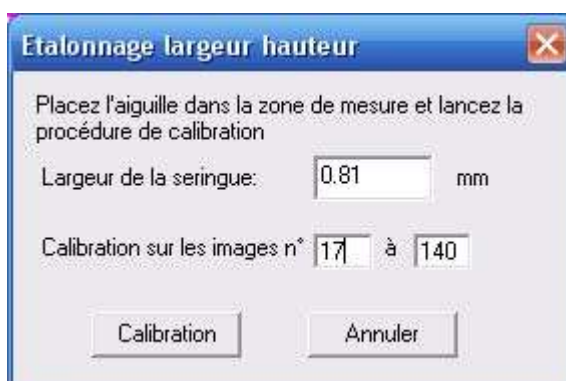
Adjust your needle to be perpendicular to the horizontal line of the pink frame and parallel to the blue line of the frame



With the Visiodrop version, you can calibrate your needle along the length of a sequence for better results

By clicking on [Calibration](#), the software will analyse the fluctuation of the diameter due to variation of signals and compute the right diameter.

All the values of the external diameter, could be find in the database [Needles](#)



After the deposition of your droplet on the surface, a sequence has been recorded. Select for you what image can be considered as the starting image of your study.

Once this has been decided

Activate the button



This task is very important as it will help in getting comparative curves.

N° 17	Temps: 640.0 ms	Durée: 140 images / 5.560 sec
-------	-----------------	-------------------------------

From the above display, one can deduct:

- 1/ the image displayed on the screen is # 17 and was taken at the time 640 ms.
- 2/ I have recorded 140 frames
- 3/ The recording time is 5,560 s

Après avoir sélectionné l'image 17 comme l'instant T=0s, l'information se transforme :

N° 17	Temps: 0.0 ms	Durée: 140 images / 5.560 sec
-------	---------------	-------------------------------

Séquence

Début	Fin	Inc
17	140	1
0	0	0
0	0	0

Analyse Stop

☒ Rapide
☐ Opt Avancée

Before starting the analyse of your measures, select your measurement mode and enter the # of the initial image and # of the final image.

If the sequence is too long, you can select, « x » image each 10 images, « x » equal s from 1 to 10. Input this data in the **Inc** (incrémentation) box.

For starting the process , activate **Analyse**

You can select the Fast option to speed up your analysis.

By selecting the **Advanced Opt** the dialogue box will open

You could select different methods of measurements depending on the variations of the shapes of the droplet

Before starting your measures, insuyre that all the surfaces are cleanned with ethanol if possible (not acetone). The cleaning product must nor react chemically with the surface , nor contaminate it. Don't use a paper which can bring dust to clean the surface and don't put your finger on the surface

Propriétés avancées de l'analyse

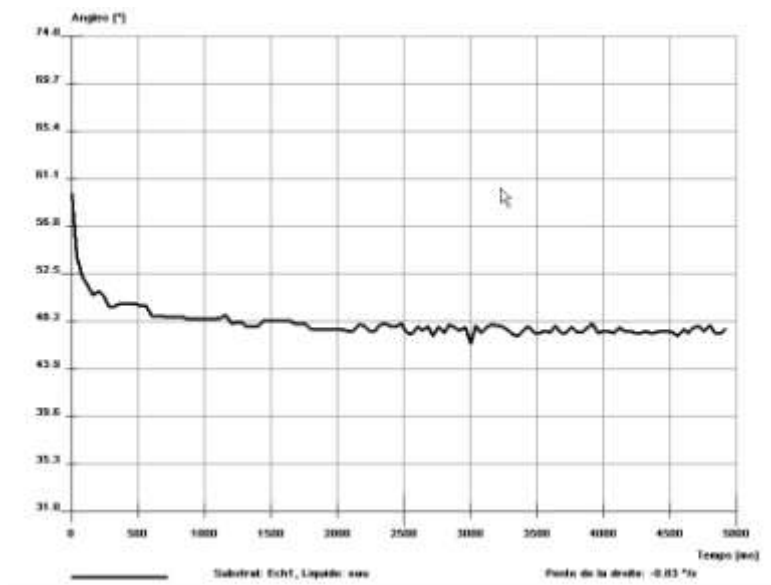
Début	Fin	Inc	Mode de mesure
17	140	1	contour
0	0	0	contour
0	0	0	contour

OK Cancel

1-4 The graphs

In the kinetic menu, the graphs are a very important point. It is why the number of proposed graphs is important

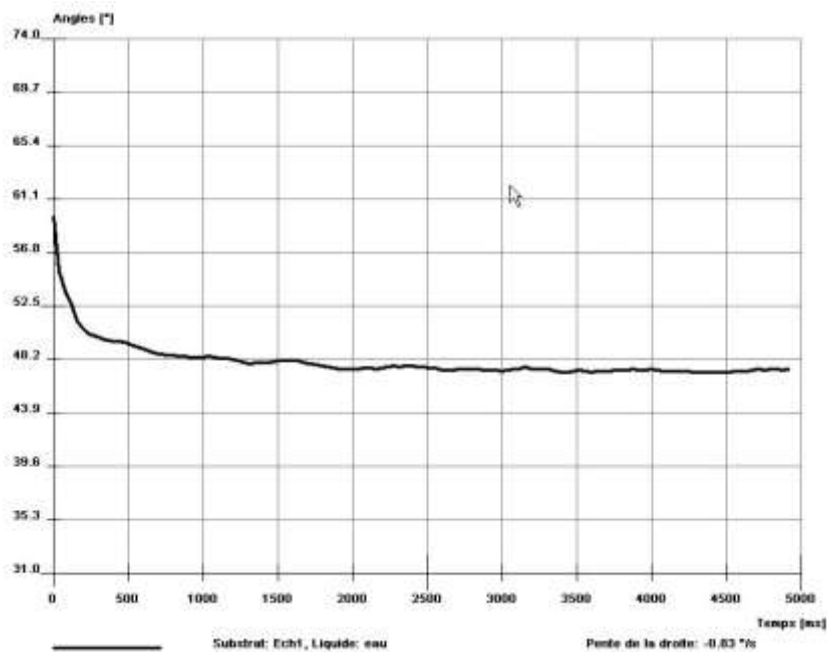
Measure -Visualisation - Graph Angle vs Timp displays the following curve type :



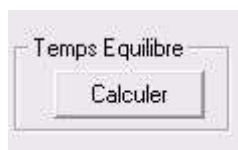
This is a raw curve, you can improved its appearance by using .

Measure - Visualisation mode - Lissage - Avec - Moyenne mobile période 7

After that treatment your curve looks like this :

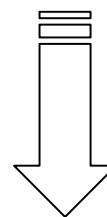


The software helps you in determining the equilibrium time.

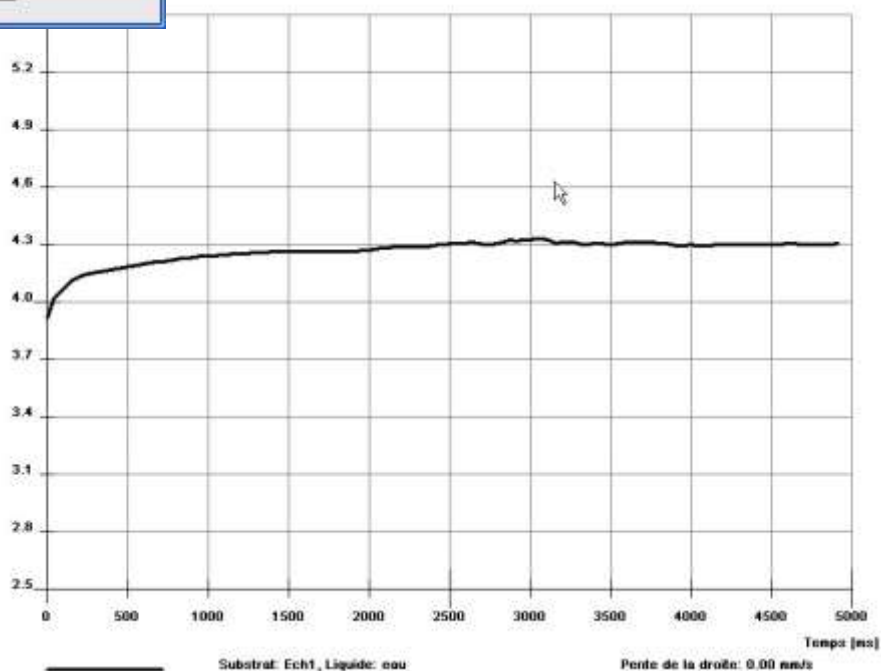


Once the caption **Calculer** is selected , The below window opens

Select the couple to be analysed if there are more than one..

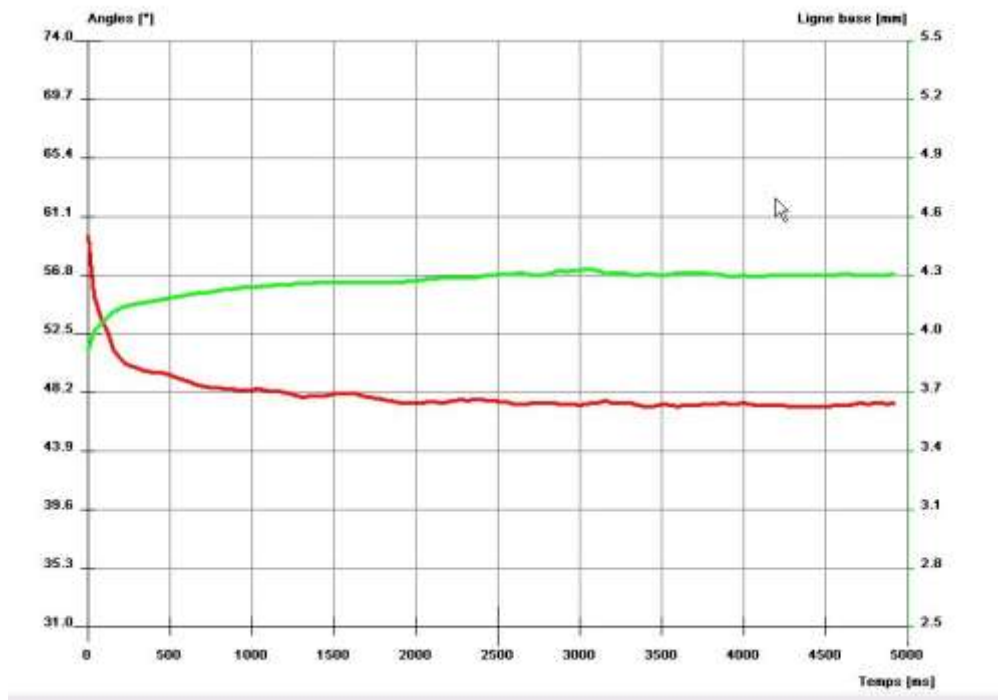


We can displa the volume and the base line vs time

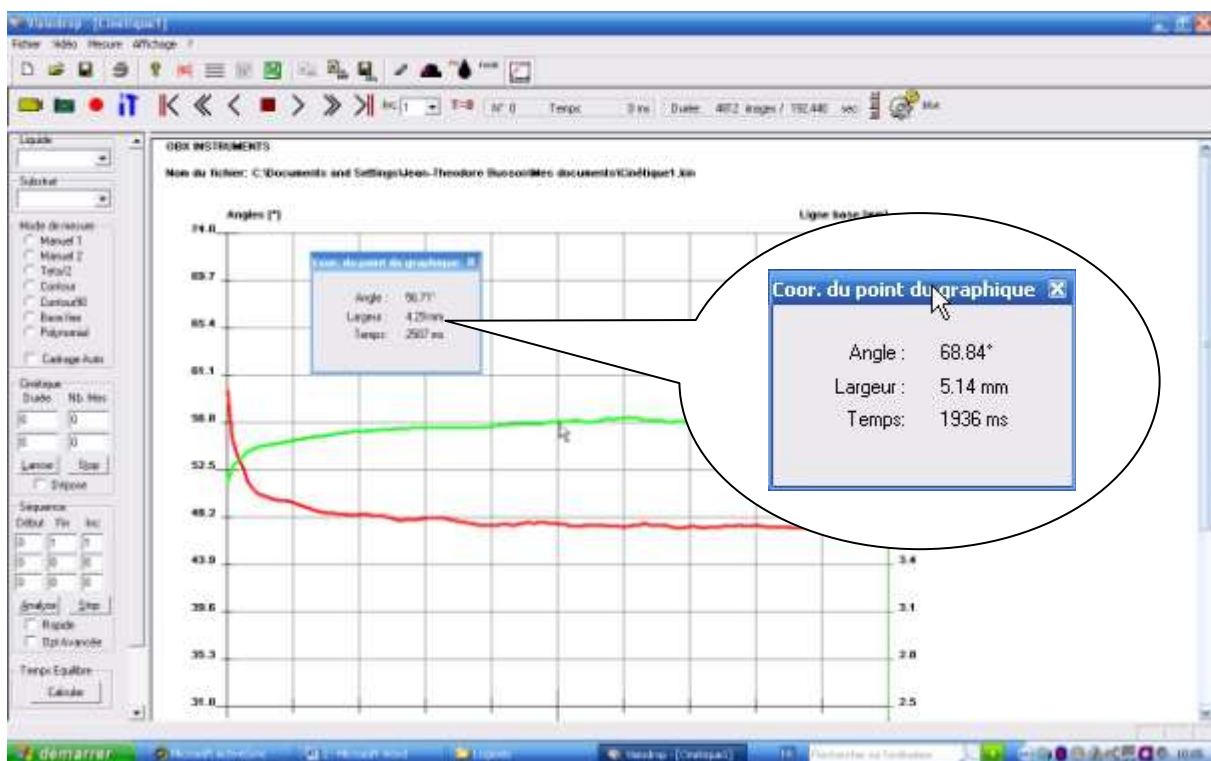


With Visiodrop, you can get both curves on the same graph.

Measure - Visualisation Mode - Graph Angle/Base - TIME - select again the couple to be analysed

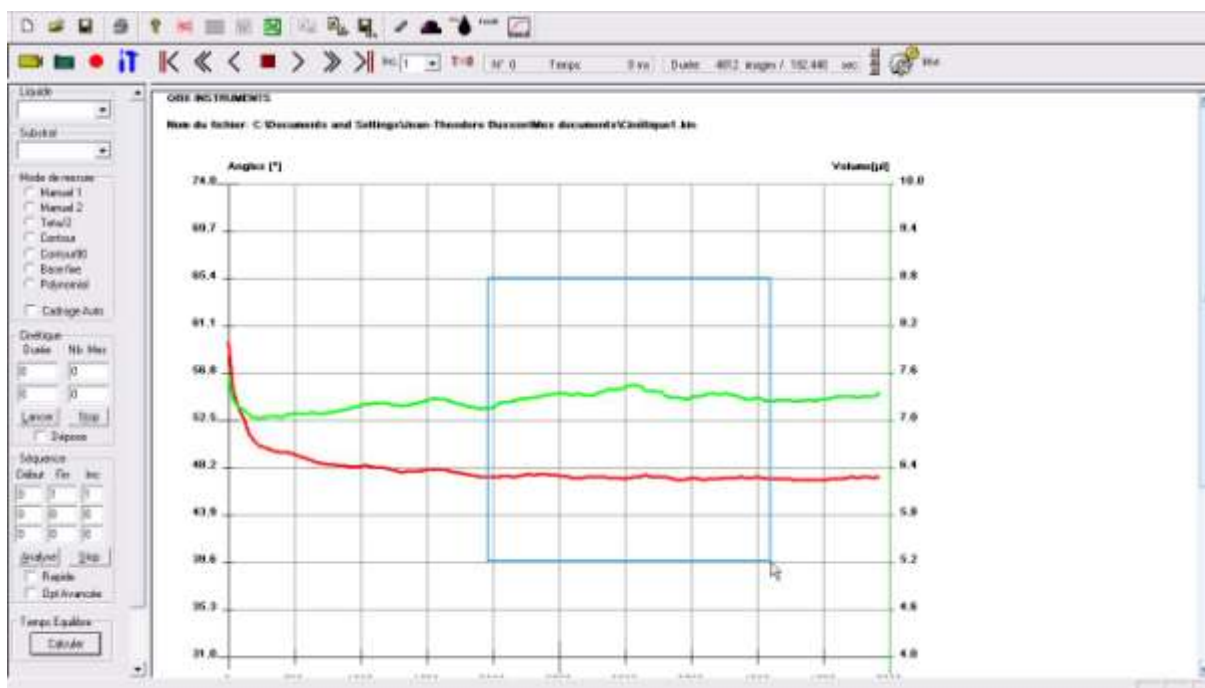


You can read the coordinate of the points of the graph by selecting this shortcut



1-5 Zoom

A zoom facility is proposed. Fly over the graph while holding the right side of your mouse.



Release the mouse



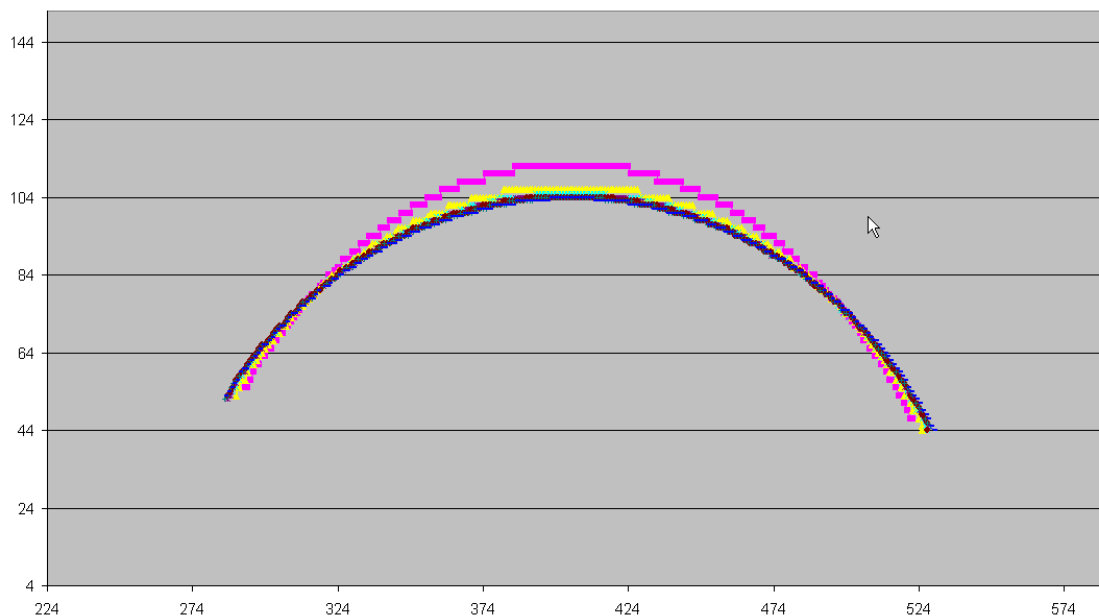
1-6 Excel Exportation of your data

Follow the following actions [File - Export data Excel](#) (or click on the shortcut Excel icon)

Excel will open automatically and displays the below sheets :.

Contours / Angle moyen / Larg. / Volume en ul / **Résultats Cinétique - DGD** / Tableau / Tableau de contours /

The Contours of the droplets are displayed with their corresponding points



Corresponding points

Mesure n°2			Mesure n°3			Mesure n°4			Mesure n°5		
X	Y		X	Y		X	Y		X	Y	
292	55		289	53		287	52		286	52	
293	55		290	55		288	53		287	53	
294	57		291	57		289	55		288	55	
295	59		292	59		290	56		289	56	
296	61		293	59		291	58		290	58	
297	61		294	61		292	59		291	59	
298	63		295	61		293	60		292	59	
299	63		296	62		294	61		293	61	
300	65		297	63		295	62		294	62	
301	65		298	64		296	63		295	63	

All the other data are available too in the other sheets.

Microsoft Excel - Classeur3												
Fichier Edition Affichage Insertion Format Outils Données Fenêtre ACTI												
A1 N°												
N°	Liquide	Substrat	A. G.	A. D.	Angle Moyen	Larg.	Haut.	Vol	Aire	V/A	Temps	Mode
2	1	1	1	45,8	50,3	48	4,3	0,9	7,37	17,3	0,43	5,56 polynomial
3	2	2	1	56,7	62,9	58,8	3,9	1,1	7,55	16,1	0,47	0,64 contour
4	3	2	1	47,8	60,5	54,2	4	1	7,19	16,2	0,44	0,68 contour
5	4	2	1	51,3	53,2	52,3	4,1	1	7,12	16,3	0,44	0,72 contour
6	5	2	1	48,7	54,3	51,5	4,1	1	7,03	16,3	0,43	0,76 contour
7	6	2	1	50,7	50,5	50,6	4,1	1	6,97	16,3	0,43	0,8 contour
8	7	2	1	49,8	52	50,9	4,1	1	7,13	16,5	0,43	0,84 contour
9	8	2	1	50,4	50,9	50,7	4,2	1	7,19	16,6	0,43	0,88 contour
10	9	2	1	49,2	49,8	49,5	4,2	0,9	6,98	16,5	0,42	0,92 contour
11	10	2	1	49,2	49,8	49,5	4,2	0,9	6,98	16,5	0,42	0,96 contour
12	11	2	1	48,3	51,3	49,8	4,2	1	7,08	16,6	0,43	1 contour
13	12	2	1	48,3	51,3	49,8	4,2	1	7,08	16,6	0,43	1,04 contour
14	13	2	1	48,3	51,3	49,8	4,2	1	7,08	16,6	0,43	1,08 contour
15	14	2	1	48,3	51,3	49,8	4,2	1	7,08	16,6	0,43	1,12 contour
16	15	2	1	48,3	50,9	49,6	4,2	1	7,15	16,7	0,43	1,16 contour
17	16	2	1	48,3	50,9	49,6	4,2	1	7,15	16,7	0,43	1,2 contour