UV-PRO SOFTWARE

User's manual

Ref. 0NPRAU-E

SECOMAM
BY AQUALABO

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1 REMARKS

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SECOMAM
UV-PRO

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2 WARRANTY

The new equipment and material sold by AQUALABO ANALYSE is guaranteed against any manufacturing defects for one year (unless otherwise stated by AQUALABO ANALYSE) with effect:

- From the technical acceptance of the equipment in the factory by the buyer or his designee,
- or failing this :
    - * For Metropolitan France: from the date on the delivery note.
    - * For other destinations: from the date of factory shipment certified by air waybill, consignment note or bill of lading.

The AQUALABO ANALYSE company guarantee applies exclusively to defectiveness arising from a design fault or from a concealed defect. It is strictly limited to the free dispatching of replacement parts (except for consumable items) or to the repairing of the equipment in our workshops within a deadline of 10 working days (shipping delay not included).

By express agreement, the following are strictly excluded from our guarantee:

- All damages, notably for staff costs, loss of earnings, business trouble, etc
- Any breakdown due to an incorrect use of the equipment (non adapted mains, fall, attempt at transformation, etc) or to a lack of maintenance by the user or to poor storage conditions.
- Any breakdown due to the use of parts not supplied by AQUALABO ANALYSE, on AQUALABO ANALYSE equipment
- Any breakdown due to the transporting of the equipment in packaging which is not its original packaging
- The lamps, the cells and generally any item which appears in the "accessories" section on the price list.

Our customers are kindly asked to apply for our consent before returning any instrument for repair. No return of materials may be accepted without the prior written consent of our Servicing after Sales Management which will precise the terms of such return.
If the above consent is given, articles shall be returned in their original packaging on a prepaid basis to the following address:

AQUALABO ANALYSE - SECOMAM - 91 avenue des Pins d'Alep – 30100 ALES - FRANCE

We reserve the right to reship all instruments received collect failing such consent.

Whatever method and conditions of transport are chosen for the shipment of the equipment to be repaired under guarantee, in the original packaging, the corresponding costs and the insurance costs will be payable by the customer.

Any damage connected to the return transport of the equipment falls within the framework of the guarantee on the express condition that the customer has sent his complaint within forty-eight hours by registered letter with acknowledgement of receipt to the carrier. A copy of the letter should be sent to AQUALABO ANALYSE.

For equipment with a guaranty card, this is only applicable if the card delivered with the equipment is returned to AQUALABO ANALYSE duly completed.

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The software is guaranteed by the designer or the distributor of the software under the conditions specified in the literature accompanying the aforementioned software packages.
Under no circumstances whatsoever will AQUALABO ANALYSE supply any type of guarantee for software packages.
By express agreement, all damages, notably for staff costs, lost of earnings; business trouble, etc are strictly excluded from our guarantee.
The customer is informed that the software cannot be guaranteed exempt from defects or bugs.

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3 INFORMATION

The AQUALABO ANALYSE equipment has been designed, manufactured, tested and inspected according to the ISO 9001 standards (Version 2000).

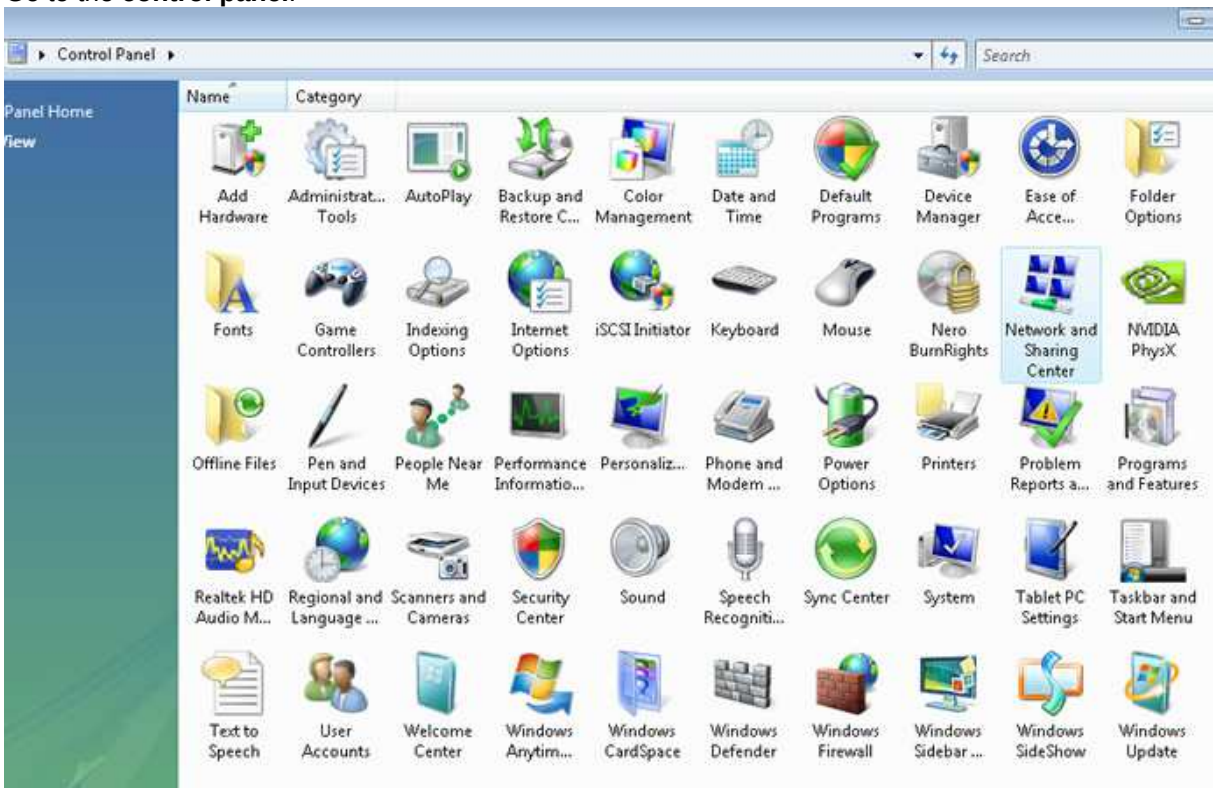
If the unit is not immediately installed, it should be stored in a dry and clean area. The storage temperature should be between 10 and 35°C.

AQUALABO ANALYSE equipment is carefully inspected before it is packed. As soon as you receive your equipment, check the condition of the packaging and if you notice any problems, notify your carrier within 48 hours. Then consult the packing list and check that everything is in order. Finally, if you discover that something is missing, or if the goods are damaged immediately notify AQUALABO ANALYSE.

4 CONFIGURATION OF YOUR WINDOWS OPERATING SYSTEM IN ORDER TO USE LABPOWER SOFTWARE

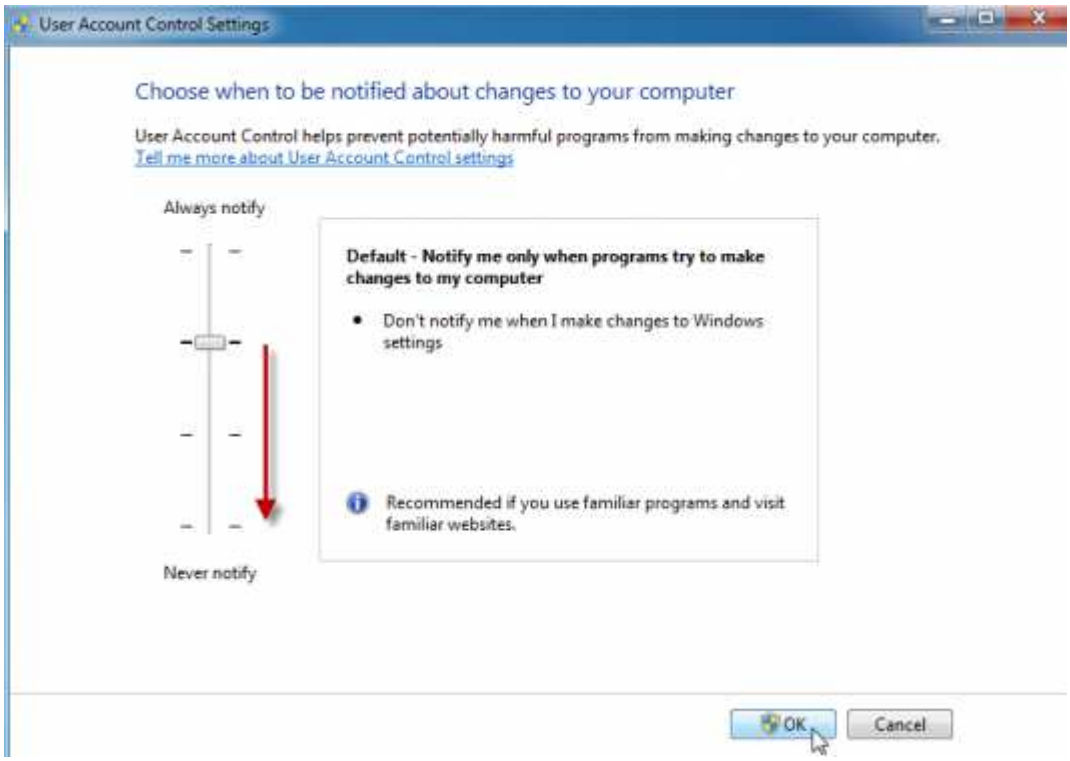
4.1 DEACTIVATE THE UAC

UAC means "**User Account Control"**, it came out under Windows Vista and is now implemented on the last Microsoft operating systems.
The following will explain how to proceed to deactivate the UAC:
Go to the **control panel**.



Then click on **user accounts**.

Then click on "**change settings of the user account control**", to reach the following window.



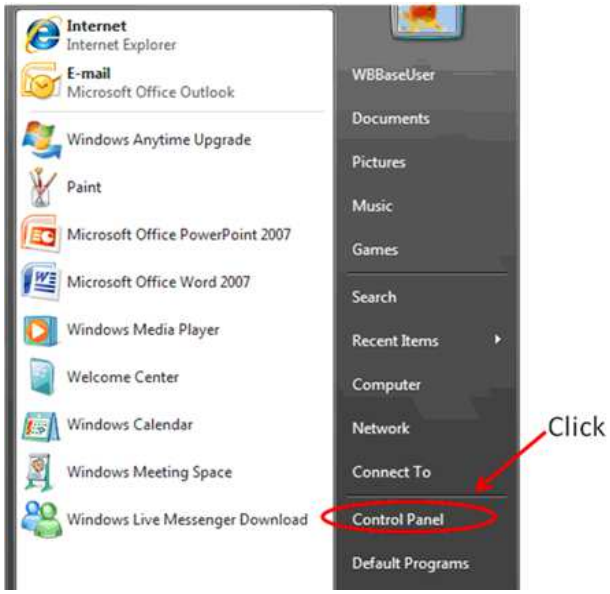
So, as you understood, if you wish to deactive the UAC, place the cursor right at the bottom on "**Never notify**".

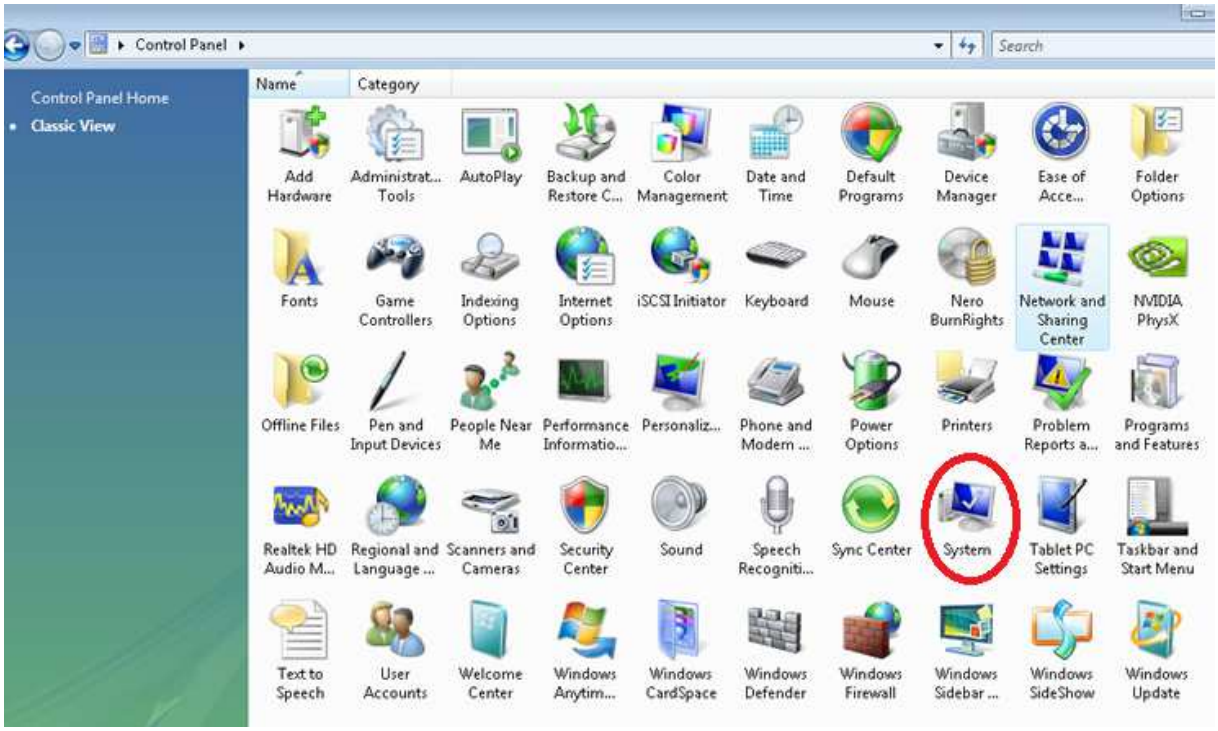
4.2 CHECKING THE VERSION OF YOUR OPERATING SYSTEM

You must know the version of your Microsoft operating system in order to use SECOMAM software as they only operate with a 32 bits version operating system.

Under Windows :

1. Click on the "**Start**" button.
2. Then click on "**Control panel**".
3. Double click on the icon "**System**".





This shows the version of your operating system.

5 INTRODUCTION

5.1 RECALLS

The exploitation of water UV spectrum is based on two hypothesis :

- UV spectrum of the sample is the sum of absorption spectra named reference spectra.
- the combination of a small number of spectra of reference allows, in the majority of the cases, to reconstitute the shape of UV spectrum of an unknown sample.

Multiwavelength method

The method of calculation is based on the fact that any spectrum corresponds to a linear combination of some reference spectra, one speaks then about the spectral deconvolution.

A data-processing program was conceived to allow the calculation of the contribution coefficients of reference spectra in an unknown spectrum. Consequently, it is thus possible to deduce the value of any associated parameter.
To analyze specific compounds such as nitrates or detergents, only one reference spectrum is necessary to the treat the results. For the global parameters such as COD, BOD, TOC, TSS, it is necessary to use several reference spectra to analyze the unknown sample.

The method of deconvolution used is based on a procedure of matrix algebra.
Each spectrum can be regarded as a linear combination of a small number p of reference spectra.
The coefficients *ai* of the linear combination are calculated by the resolution of a system based on the following relation established for each wavelength with:

$$Se(\lambda) = \sum_{i=1}^{p} ai.REFi(\lambda) \pm r$$

Se(λ): is the sample absorbance.
REFi(λ): is the absorbance of the reference compound *i*
r: is the error.

If the parameters are additive as for TOC for example, the following relation is used:

$$Pe = \sum_{i=1}^{p} ai.PARi \pm rp$$

with:
Pe: is the sample parameter.
PARi: is the parameter of the reference spectrum *i* (it is the subject of a calibration)
rp: is the error on the parameter value.

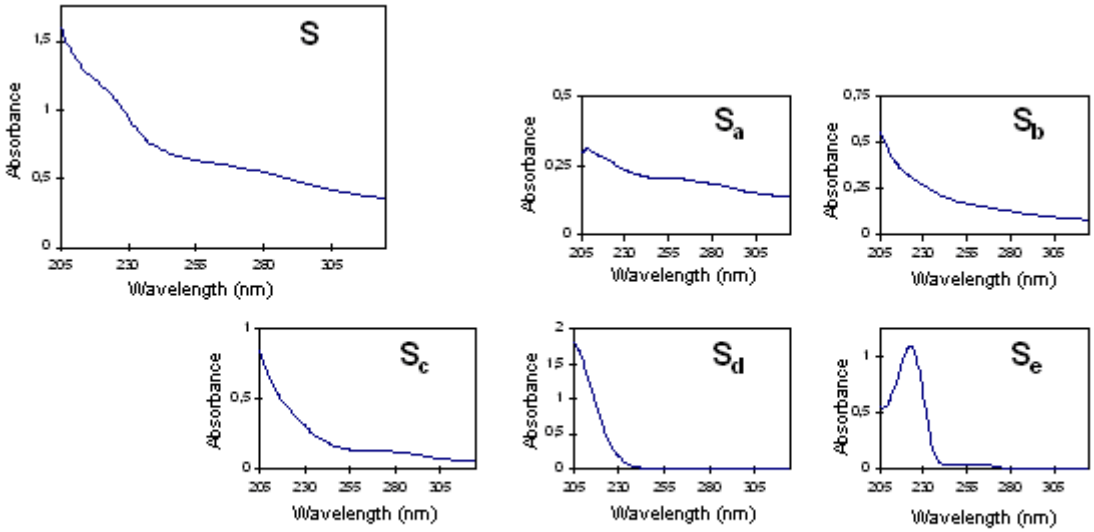
The checking of the measurement quality is obtained by the calculation of the restitution variation:

with:

$$ET = \sum_{i=1}^{n} r(\lambda i)^2$$

n: Number of wavelengths used for the calculation.
r(λi): variation of the measurement.

An example of result can be as follows:



$$S = 1{,}7356 * S_a + 1{,}4112 * S_b + 0{,}2506 * S_c + 0{,}0000 * S_d + 0{,}1150 * S_e$$

Example of a spectrum S broken up in 5 reference spectra Sa, Sb, Sc, Sd and Se whose coefficients of contribution were calculated

Thus, the absorption of waste water, urban for example, generally presents between 200 and 350 Nm, a decreasing monotonous shape. This form results from the superposition of the spectra of the various compounds present in the sample and which absorb in UV light.

5.2 SOFTWARE DESCRIPTION

UV-PRO software was developed by SECOMAM and is intended for the acquisition, digital processing and graphic spectrum of measurements made in the ultraviolet light.
The UV-PRO software can be globally used for five applications:

- the routine measurements (Module « Open a model »).
- measure and spectra processing (Spectrum module).
- instrument calibration or models creation (Recalibration module)
- communication with SECOMAM analyzer and its remote control (Servicing module).
- The uninterrupted acquisition and safeguard of the spectra and their associated results (Recovery module).

5.2.1 MODULES DESCRIPTION

5.2.1.1 "Open a model"

The routine measurements consist in the use of an already existing model.
This module allows to have the results of a sample analysis and to see the sample spectrum measured on a SECOMAM analyzer. So it is possible to know immediately if the selected model is adapted to the measure of the sample.
Samples analyzed with this module are saved the following information (user's name, sampling date, measuring date and hour, dilution factor…).
It is also possible to see the evolution in the time of one or more measurement parameters.

5.2.1.2 Spectrum module

This module allows:
- to measure, in specific way, an unknown sample and to analyze it with one or several existing models in order to compare them.
- to do spectra acquisition which will be used as reference spectra during model creation.
- to do different operation such as spectrum shift, derivative, spectra addition, spectra subtraction…

5.2.1.3 Recalibration module

This module is used when the disposal models are not adapted.

To do a new model, it is necessary to have:
- a minimum of 20 spectra. These spectra can be measured with a bench spectrophotometer using the "Spectrum module" or downloaded from a portable analyzer (PASTEL UV) or on line analyzer.
- laboratories values of measured parameters (COD, TOC, BOD…). These values are obtained either by standardized method or by the method which is used as reference in the laboratory.

This calibration can be done entirely in an automatic way. But it is also possible to take in account the presence of pure compounds such as nitrates and to use their spectrum which will have been measured beforehand in the module spectrum

5.2.1.4 Servicing module

This module allows:
- to drive different parts of online analyzer (peristaltic pump, electro valve…)
- to check deuterium lamp energy.
- to check flow through cell cleanness.
- to perform a single sample measurement.
- to download models from UV-PRO software towards analyzer and conversely
- to download spectra from portable analyzer (PASTEL UV) or online analyzer.

5.2.1.5 Recovery module

This module can be used only with online analyzer.
It allows, in reel time, spectra and results acquisition and their safeguard.

5.2.2 ACCESS LEVEL

UV-PRO software works with two access levels

User level
The access is given only for the following module:
- module « Open a model »

Programmer level
Access to the entirety of the software

The software access is done with the help of two passwords:
- one for the user's name
- one for its password

The passwords can be changed an it is possible to change the level access during the software use

WARNING: Do not use same name and same password for different access levels.

5.3 NECESSARY CONFIGURATION

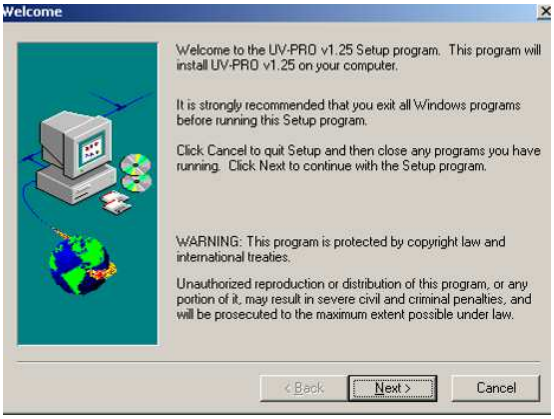
Windows 95/98, 2000, NT. XP and XP-PRO.
PC computer with
- Processor INTEL Pentium or superior
- 16 MB for RAM memory minimum
- 500 MB free on hard disk
- CD-ROM driver
- RS 232C port
- Monitor 800x600

6 INSTALLATION & STARTING UP

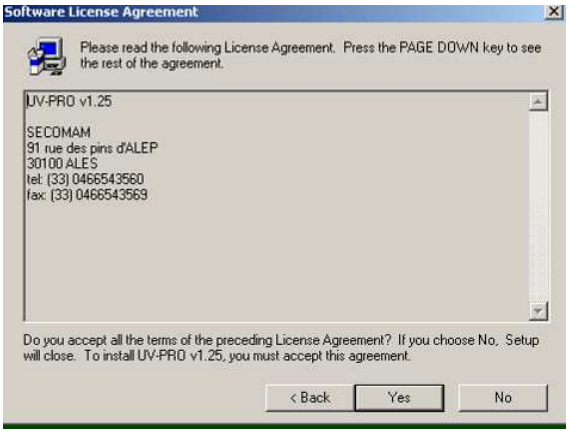
<u>WARNING:</u> IF YOUR COMPUTER IS MANAGED BY AN ADMINISTRATOR, CONTACT HIM, IN ORDER TO HAVE NECESSARY AUTHORIZATION TO INSTALL UV-PRO SOFTWARE.

6.1 SOFTWARE INSTALLATION

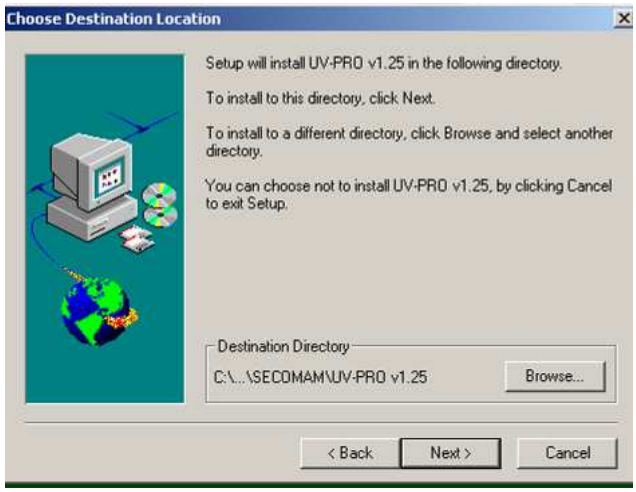
1 – Insert the CD-ROM of UV PRO software inside the CD-ROM drive.
2 – The software installation will start by itself.



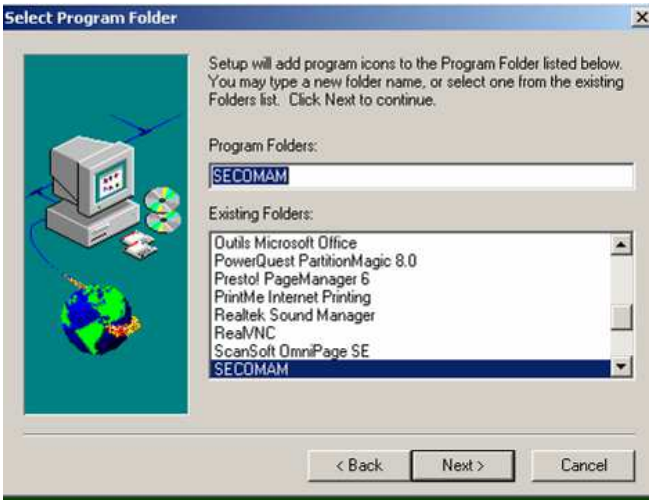
- Click on « Next ».



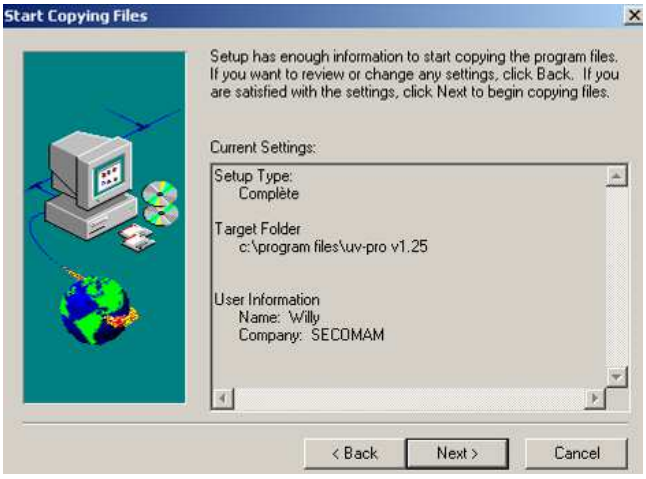
- Click on « Yes »



- Click on « Next » to install UV PRO software in the proposed directory.
- Click on « Browse » to select another directory.



- Chose « Program Folder » in which the icon will be installed.
- Click on « Next ».



- Click on « Back » to come back, otherwise click « Next ».

The software is settles and creates an icon.

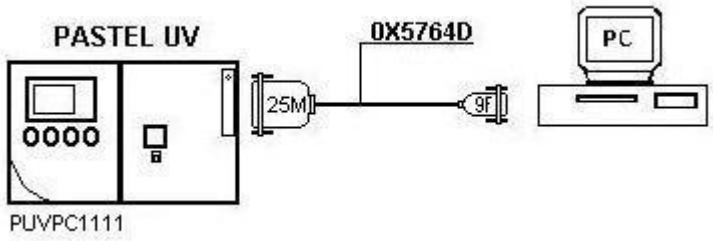
NOTE: It is also possible to install UV PRO software in the following way:

- Click on « Start » menu of Windows.
- Select «Execute»
- Execute «Browse» to select CD ROM drive
- Select «SETUP.EXE»
- Click « OK ».
- To refer then to the beginning of this paragraph.

NOTE: To replace a version of UV PRO software already installed, re-install the new version on the previous one.

6.2 STARTING UP

6.2.1 Connection with PASTEL UV



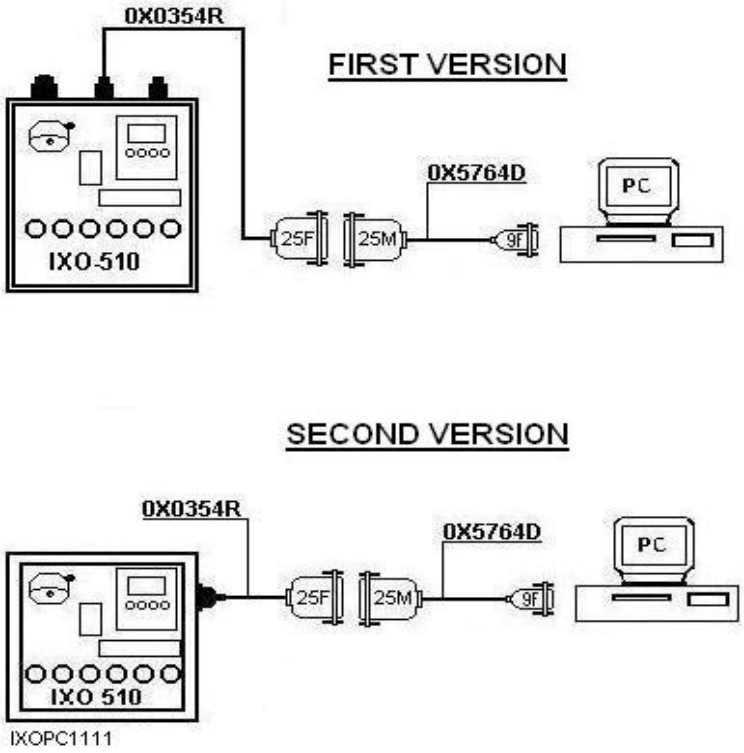
- connect PASTEL UV on the serial port of the computer (Cable ref: 0X5764D).
- switch PASTEL UV on.
- Wait until auto test is over.

Select connection type. From main menu:
- Click on « CONF ».
- Click on « PERI »
- Click on « OTH »
- Click on « OUT »
- Click on « PC ».
- Come back to the main menu by clicking on « RET »

- Click on «CONF»
- Click on «PERI»
- Click on «->PC» (bidirectional)

PASTEL UV is ready for connection with UV-PRO software.

6.2.2 Connection with IXO



- connect IXO on computer serial port (Cables ref: 0X0354R and 0X5764D).
- Switch the IXO on
- Click on “PARA”.

Select the connection type. From main menu:

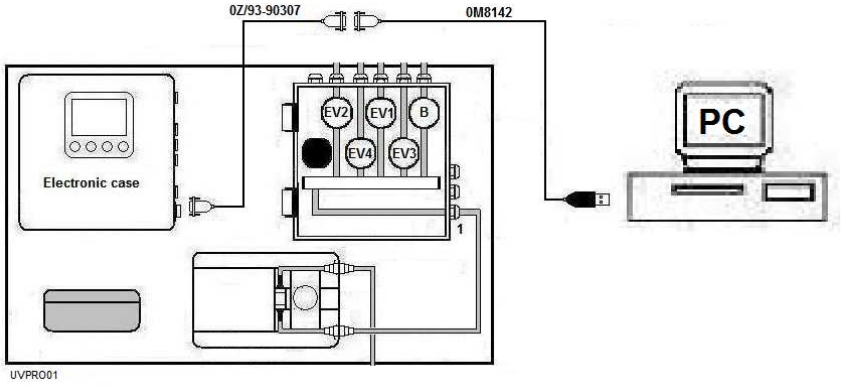
- with “NEXT” key, select «Recalibration»
- click on «MODI»
- with “NEXT” key select «Select Output»
- click on « MODI »
- click on «PC»
- come back to main menu by clicking on « RET »

- click on «->PC» (bidirectional).

online analyzer is ready for connection with UV-PRO software.

- Keep this screen as long as the analyzer is connected to UV-PRO software.

6.2.3 Connection with STAC



- connect STAC on computer serial port (Cable: 0Z/93-90307) or computer USB port (Cables: 0Z/93-90307 + 0M8142).
- Switch the STAC on
- Click on “PARA”.

Select the connection type. From main menu:

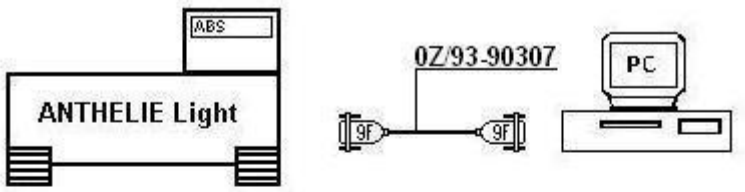
- with “NEXT” key, select «Recalibration»
- click on «MODI»
- with “NEXT” key select «Select Output»
- click on « MODI »
- click on «PC»
- come back to main menu by clicking on « RET »

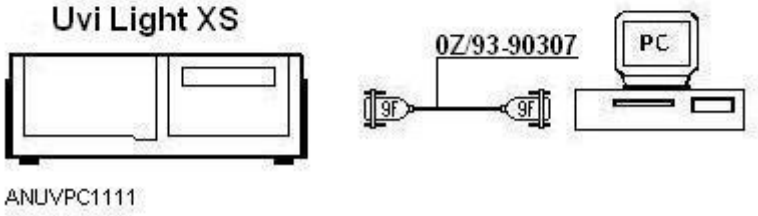
- click on «->PC» (bidirectional).

STAC is ready for connection with UV-PRO software.

- Keep this screen as long as the analyzer is connected to UV-PRO software.

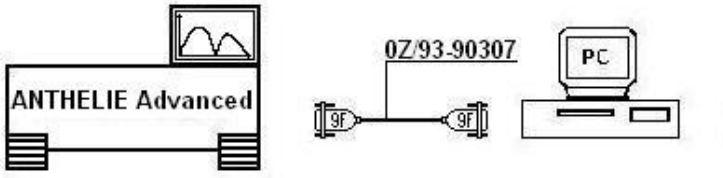
6.2.4 Connection with ANTHELIE Light / Uvi Light XS

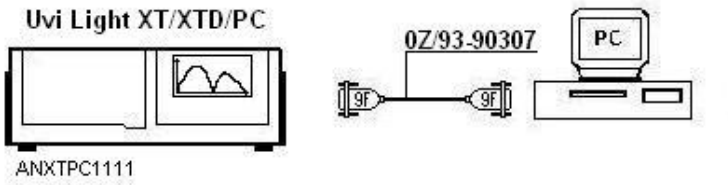




- connect ANTHELIE Light/Uvi Light on computer serial port (Cable ref: 0Z/93-90307).
- switch the spectrophotometer on and wait until auto test is over.
- select « Configuration ».
- select « RS232 Connect » and validate.
- in UV-PRO software, open « Config » and « Connection ».
- select « Anthélie Junior ».
- select « RS232C ».
- click on « OK » to run the software.

6.2.5 Connection with Anthélie Advanced / Uvi Light XT-XTD-PC





- connect the spectrophotometer on computer serial port (Cable ref: 0Z/93-90307).

6.2.5.1 ANTHELIE ADVANCED

- Remove small external cable between unit bottom and display (cable with phone connector).
- in UV-PRO software, open « Config » and « Connection ».
- select « Anthélie Junior ».
- select « RS232C ».
- click on « OK » to run the software.
- few seconds later switch the spectrophotometer on.

When connection is OK, the unit displays « PC remote ».

6.2.5.2 Uvi Light XT and XTD

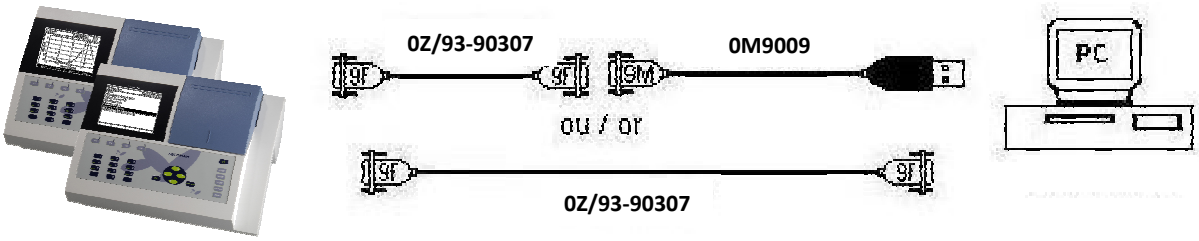
- Remove small external cable between unit bottom and internal computer of Uvi Light XT/XTD.
- in UV-PRO software, open « Config » and « Connection ».
- select « Anthélie Junior ».
- select « RS232C ».
- switch the spectrophotometer on.
- click on « OK » immediately to run UV-PRO software (There is a delay of 5 seconds maximum before Uvi Light closes its communication port).

6.2.5.3 UVI LIGHT PC

- in UV-PRO software, open « Config » and « Connection ».
- select « Anthélie Junior ».
- select « RS232C ».
- click on « OK » to run the software.
- switch the spectrophotometer on.

It will be automatically detected and the auto test will start immediately.

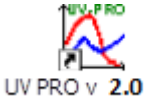
6.2.6 Connection with a UviLine



- Plug the UviLine with its power supply
- Let the UviLine screen go to sleep mode (screen switched off)
- Press the key of the UviLine to switch it on
- Then successively press the 4 following keys . , 0 , 3 , 3 (.033)
- Launch UV Pro software
- Select « Anthelie Junior » in the menu « Config » and « Connection » of UV Pro. It will be automatically detected and the autotest will start immediately.

6.2.7 Launching UV-PRO software

From the Windows menu “START”, go into Program \ Secomam \ UV Pro or click on



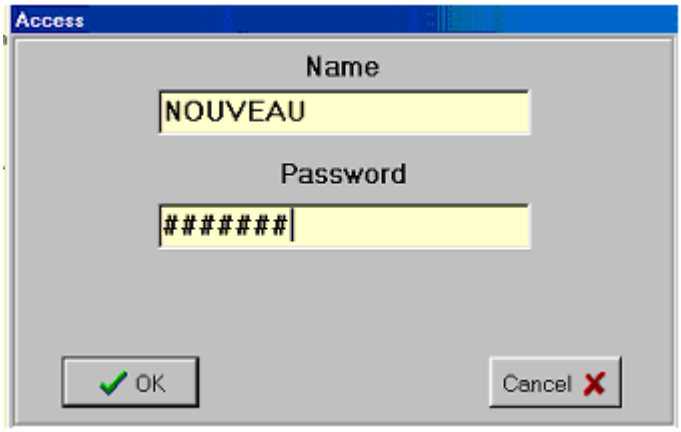
6.2.7.1 Creation of access level

There are two access levels for UV-PRO software.

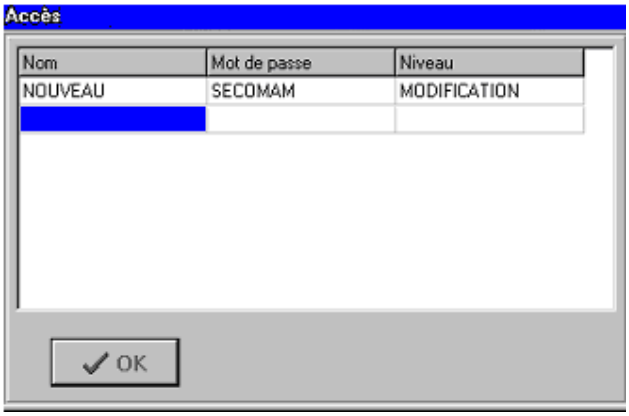
"USER" level
The operator will have only access to "Open a model" menu. When the instrument is connected, the operator will just perform samples measurements according to a selected model. He will also incorporate spectra already measured, to do calculation with a selected model.

« PROGRAMER » level
The operator has access to the totality of the software.

The software requests user's name and password.
For the primary use enter:
- For "Name" enter: "NOUVEAU" (in capital letters)
- For "Password" enter: "SECOMAM" (in capital letters)



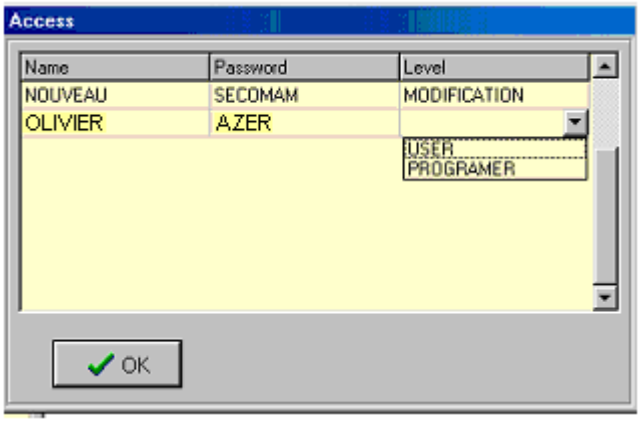
Press **« OK ».**
To enter user' name, move the cursor inside the first column (NOUVEAU); use the down arrow key of PC keyboard to add a new line.



WARNING: NEVER ERASE OR MODIFY LINE "NOUVEAU SECOMAM MODIFICATION". THE OPERATOR COULD NOT THEN HAVE ACCESS TO THIS CONFIGURATION WINDOW OF UV-PRO SOFTWARE ANY MORE.

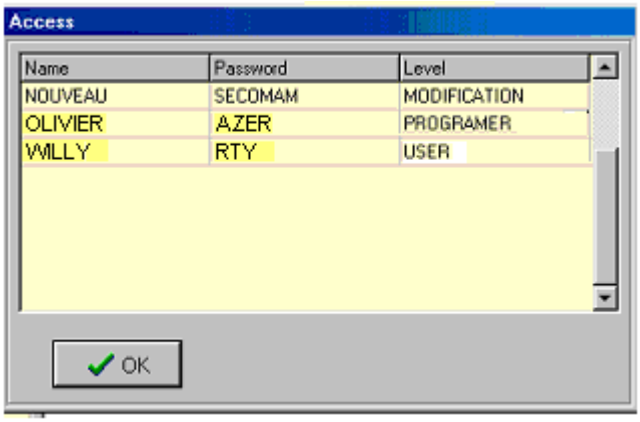
- enter new user's name and password on the column next to it.
- modify access level by clicking twice slowly on the right case, then click on:

- select the level of desired access

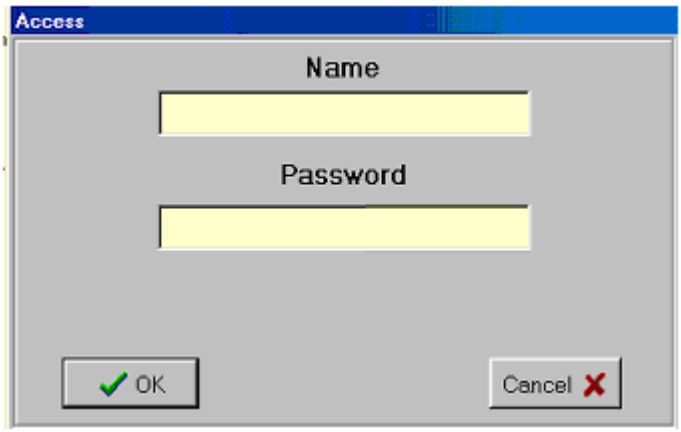


:

- add, if necessary a second operator. Place the cursor inside the last line and use the down arrow key. A new line will appear.
- enter name and password.
- select the level of desired access.



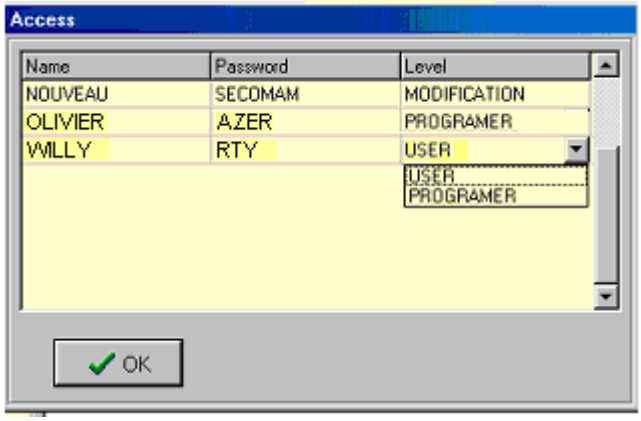
- Click on «OK».
It comes back to the following screen:



- then enter name and password according to desired access level.

6.2.7.2 Modification of access level

To modify the access level, click twice slowly on the right case and select user or programmer level with arrow key.



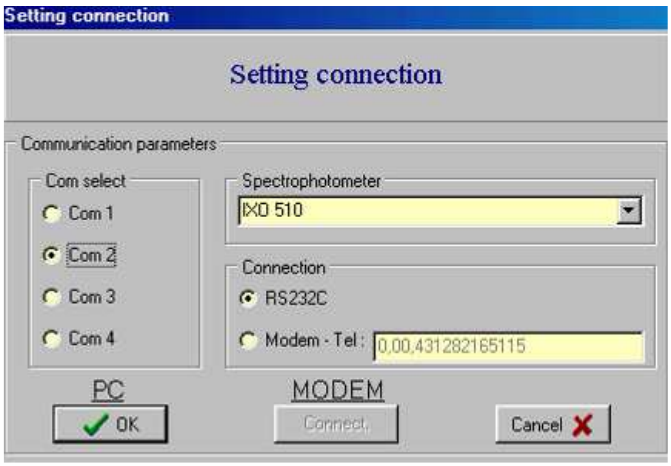
When the software is running, it is possible to come back to the window for the access level choice by clicking on:

It is located on the top right of the screen.

6.2.8 Configuration

When the instrument used is not selected in the « Configuration » menu, after auto test the following message is displayed.

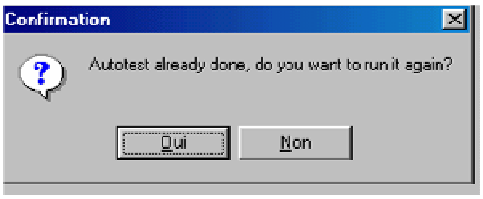
Click on «YES» to enter in configuration menu.



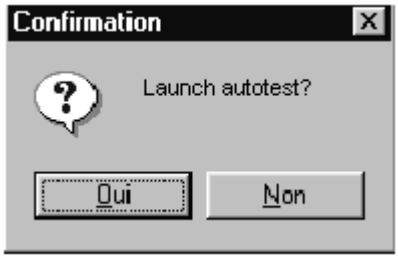
Select:
- Serial port number (Com1 to Com4)

- Instrument type:
  - Pastel UV
  - IXO-510
  - Anthelie Senior (ANTHELIE Data or Graphic)
  - Anthelie Junior (ANTHELIE Light or Advanced, Uvi Light)
  - PRIM
- Connection type (RS232C or Modem)

When instrument is detected, the following screen is displayed:

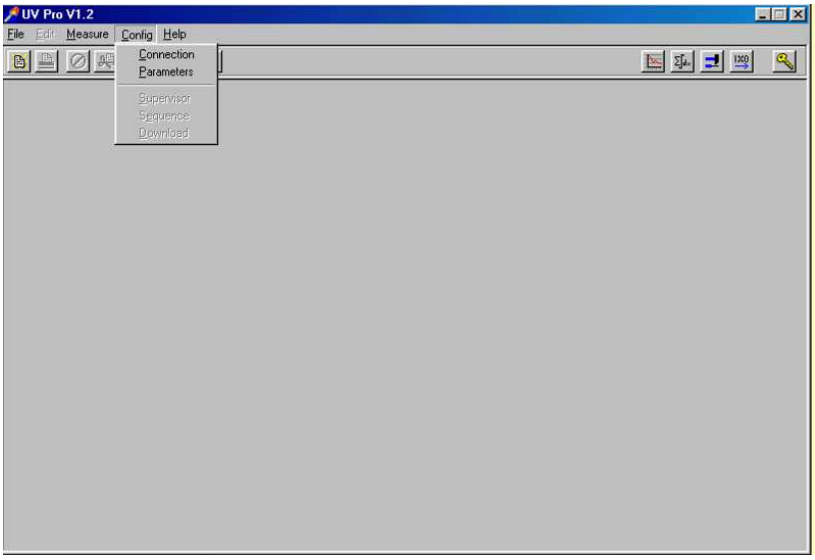


Click on «NO» to access to the main menu.

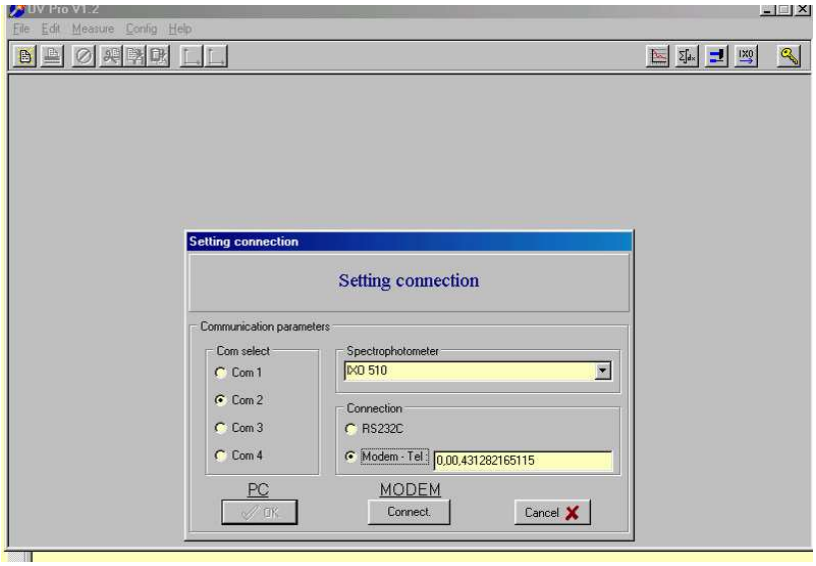


When ANTHELIE or Uvi Light spectrophotometer is used, it is the above screen which is displayed.

NOTE : It is possible to access to the configuration menu from the main menu by clicking « Config » and « Connection »



6.2.9 The use of a modem

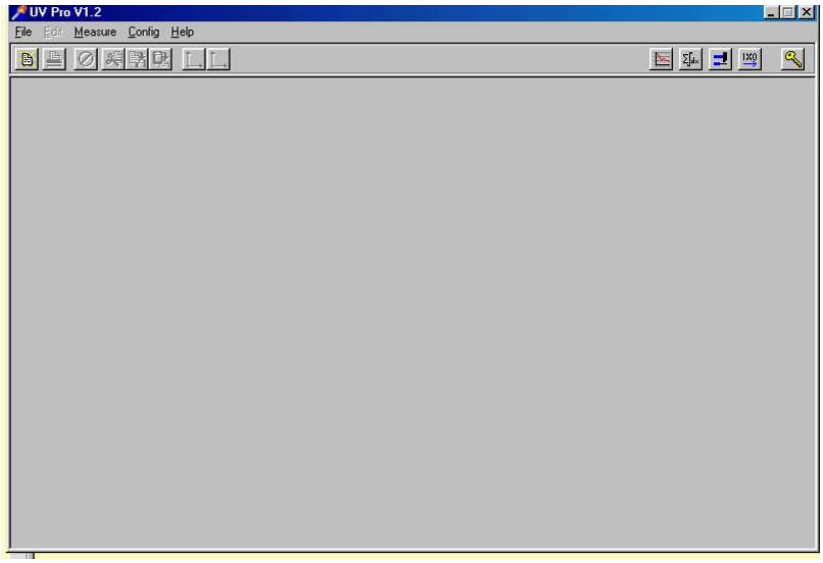


- Select Modem instead of RS232C.
- Enter the phone number for the connection with the analyzer.
- Enter in “Servicing module”
- Press « Connect ».

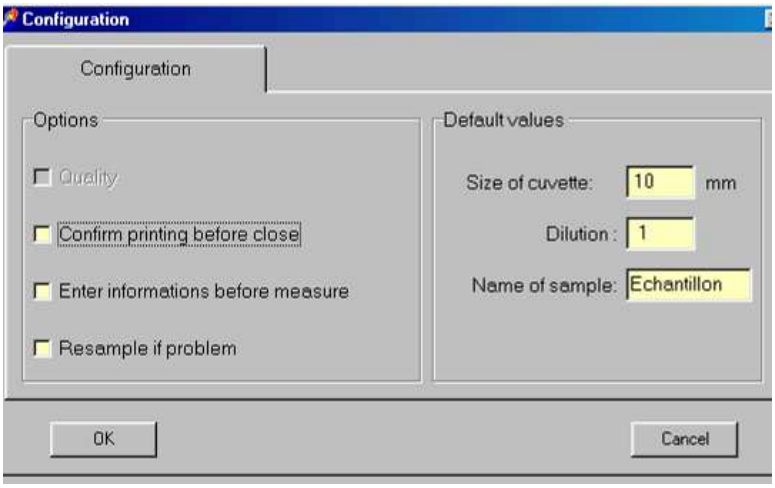
The software will communicate with the analyzer through the modem.

6.3 PARAMETERS

From this main screen:



In tool bar, select “Config” and “Parameters”.



From this window, it is possible to modify the options suggested and values put by defects

6.3.1 Options suggested

- Quality (Traceability): not available for the moment.

- Confirm printing before close:
At the time of closing a window appears to indicate that the results of the day were not printed. The operator has possibility to print or not the results

- Enter information before measure:
Option to enter the sample's identification, site and date of sampling before measuring.

- Resample if problem:
Option to re-measure the sample if the software detects any anomaly (ex: the sample spectrum is saturated).

6.3.2 Default values

- Cuvette size:
By defining the cuvette size before operation, user will no longer need to do so before every reading.

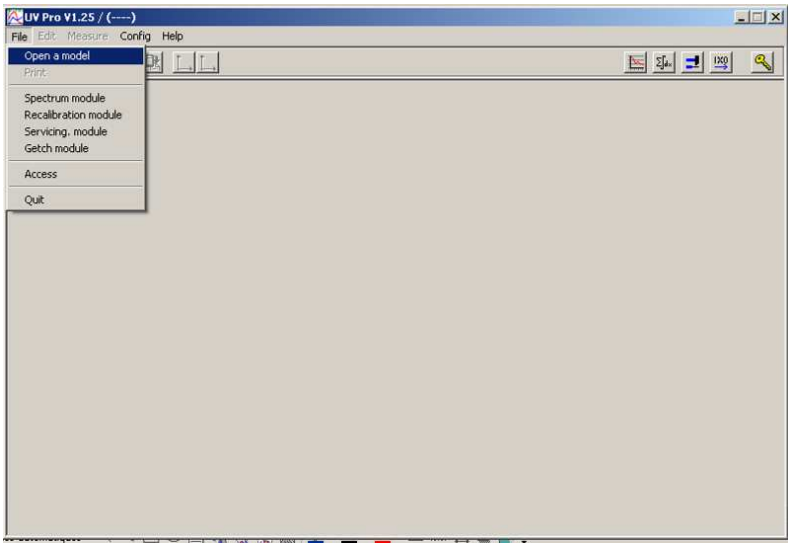
- Dilution:
The dilution factor can be defined. Dilution factor equal to **1** means that the sample is not diluted.

- Name of Sample:
User can enter sample identification number and the software will automatically increase the number by one at every new measurement.

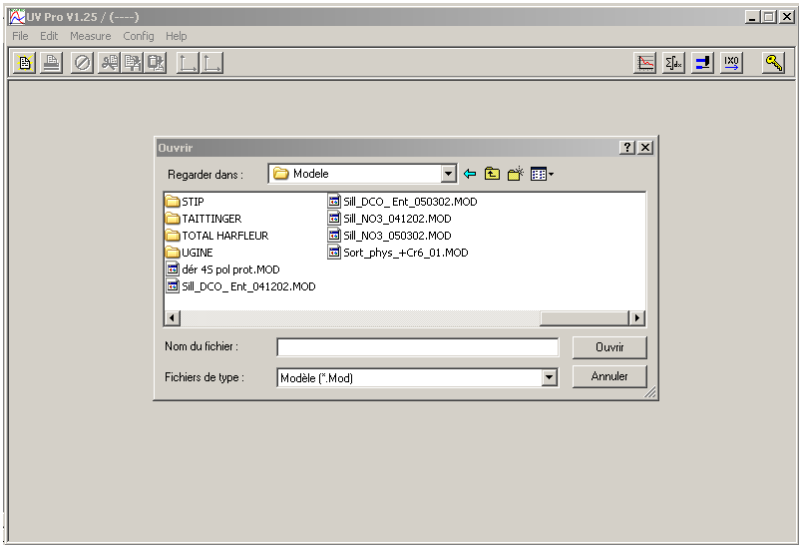
7 ROUTINE MEASUREMENTS

We called routine measurements, some measurements which used pre-existing models.
The operation is as following:

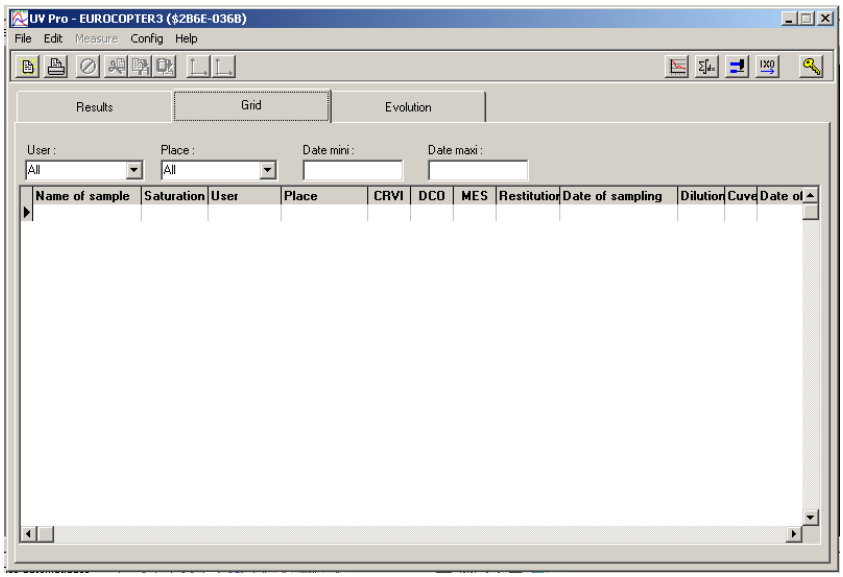
- Choice of the working model.
- Model downloading.
- Instrument zeroing.
- Sample measurement (acquisition of sample spectrum).
- Calculation of parameters concentration using the selected model.
- Displaying of parameters concentration.



- Select “File” and “Open a model”. The directory “Model” is opened.



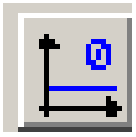
- Select the working model.



7.1 MEASURE

7.1.1 Blank measurement

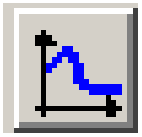
Do a baseline on **quartz** cuvette filled with "**clean**" distilled water. This step is referred to as «Zero».
- Install the cuvette inside the instrument.

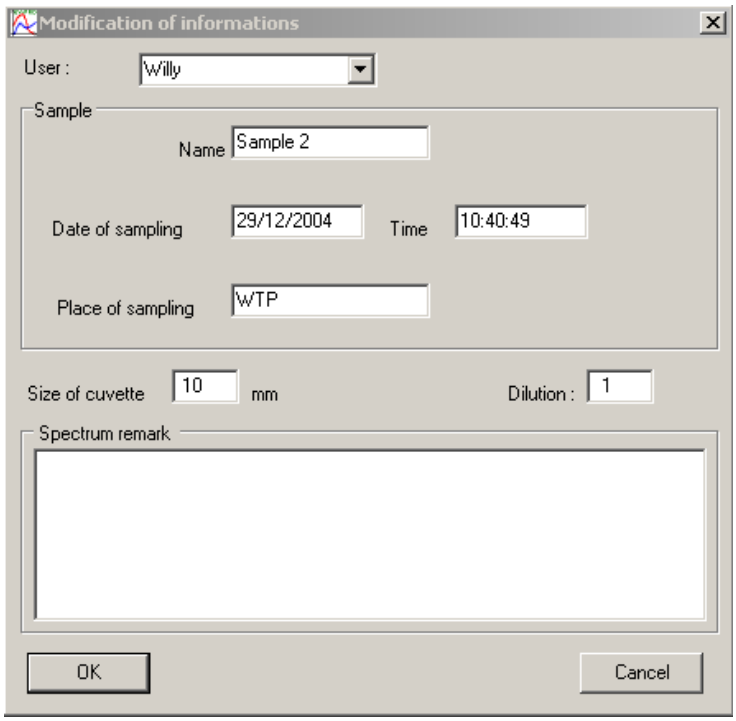
- Click on  or select "Measure" and "Baseline"

NOTE: If this operation is obvious on a spectrophotometer like ANTHELIE or Uvi Light, it is not the same with the analyzers.
- On PASTEL UV in stand alone mode, it is not necessary to perform a baseline because it is already saved in memory. If the PASTEL UV is directly used with UV-PRO software, the operator will not launch a measure if the baseline is not executed. So, the operator has to do a baseline with same quartz cuvette (O.P. 5 or 10 mm) that he uses to measure the sample.
- On the online analyzer it is preferable to use the "Servicing Module" of UV-PRO software to realize specific measurement.

7.1.2 Samples measurement

- Fill the cuvette with the sample (See hereafter the precautions to be taken).

- Click on  or select "Measure" and "Measure".



- Enter information concerning sample traceability, the cuvette size and the dilution ratio.

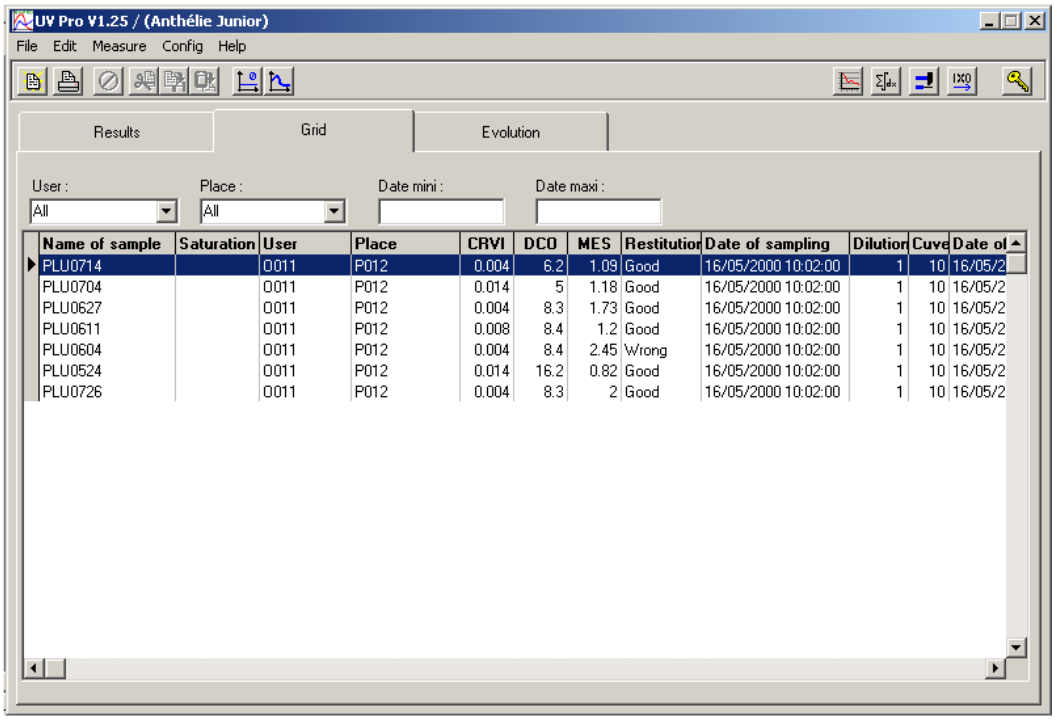
NOTE:
Dilution: **1** means there is **no** dilution.
Dilution: **2** means there is **1** sample volume for **1** distilled water volume
Dilution: **3** means there is **1** sample volume for **2** distilled water volumes
And so on.

- Click on “OK”.
The instrument measures the sample.
- Proceed the same way to measure other samples.

Precautions at the time of the measurement of the samples

- For the micropipette, use pipette tips whose diameter of the extremity is higher than 1 mm to avoid filtering TSS
- Aspire slowly and gradually the homogenized sample.
- Fill the cuvette by slowly driving back the sample on the cuvette wall.
- Wipe carefully the cuvette.
- BE CAREFUL TO THE FINGERS TRACES
- BE CAREFUL TO THE CONDENSATION IF THE SAMPLE IS COLD
- Shake the cuvette.
- insert the cuvette in its compartment.

Then, we will have the following screen:



Name of sample	Saturation	User	Place	CRVI	DCO	MES	Restitution	Date of sampling	Dilution	Cuve	Date of
PLU0714		0011	P012	0.004	6.2	1.09	Good	16/05/2000 10:02:00	1	10	16/05/2
PLU0704		0011	P012	0.014	5	1.18	Good	16/05/2000 10:02:00	1	10	16/05/2
PLU0627		0011	P012	0.004	8.3	1.73	Good	16/05/2000 10:02:00	1	10	16/05/2
PLU0611		0011	P012	0.008	8.4	1.2	Good	16/05/2000 10:02:00	1	10	16/05/2
PLU0604		0011	P012	0.004	8.4	2.45	Wrong	16/05/2000 10:02:00	1	10	16/05/2
PLU0524		0011	P012	0.014	16.2	0.82	Good	16/05/2000 10:02:00	1	10	16/05/2
PLU0726		0011	P012	0.004	8.3	2	Good	16/05/2000 10:02:00	1	10	16/05/2

Are displayed
- Traceability information
- Concentration of measured parameters.

7.2 RESULTS

7.2.1 "Grid" index

This table shows the whole measured samples with their traceability (sample name, sampling site and date, measurement date and hour, cuvette size, dilution ratio and possible comments) according to the selected model.

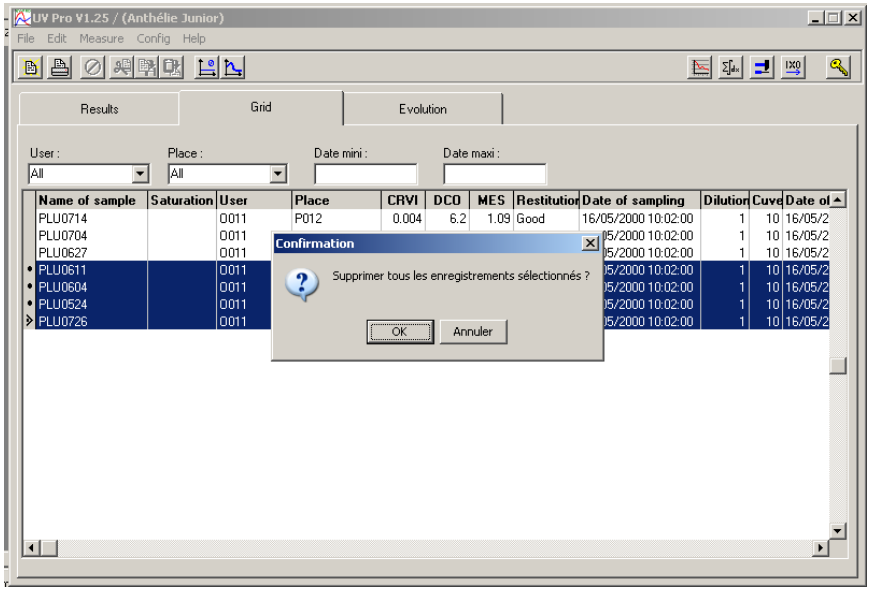
It is possible to make ascending or downward sorting on the whole of the columns while clicking on the name of the desired column.

The message "Saturated" can appear in the second column if the spectrum is saturated (Absorbance > 2.0).

In the "Restitution column" a message shows if the restitution is
- "Good": restitution gap ≤ 4% or
- "Wrong": restitution gap > 4%.

NOTE: To erase one or several results, proceed as follow:
- Select the first spectrum by clicking on its name.
- Press on "Ctrl" key of the keyboard.
- Maintain this key pushed and click on the name of the other spectra to be erased.
- When all spectra are selected, press in the same time "Ctrl" key and "Del" key

It displays:



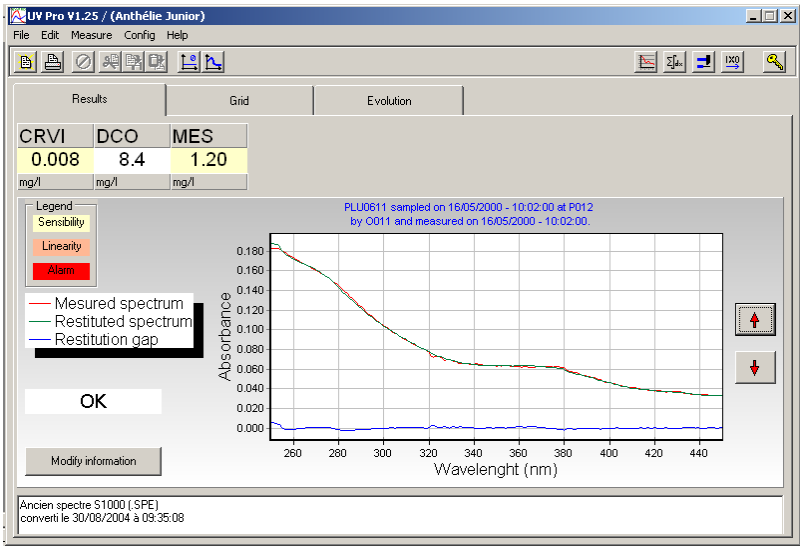
- Click on “OK”.

After to open a model, in place of spectra acquisition, and if they are already memorized, it is possible to insert them directly in the table. The software will give, for each one, same information as they have been measured.
Proceed as follow:
- Select “Edit” and “Insert spectra”.
- Select one or several spectra.
- Validate.

The spectra are then inserted in the table with same information as they have been measured.

7.2.2 “Results” index

The “Results” index displays the measured spectrum, the parameters concentration according to the selected model, the restituted spectrum, a curve which is the image of the restitution gap and validation messages “OK” or “Warning” corresponding to restitution quality.



The following information is displayed:
- Parameters concentration.

The background color on which the result is displayed depends on the going beyond or not of the threshold indicated below.

- White background: The result is included between the sensibility threshold and the linearity limit and it does not pass over the alarm threshold.
- ***Yellow background:*** The result is under sensibility threshold.
- Pink background: The result is above linearity limit.
- Red background: The result is above alarm threshold.
- Result characters written in purple: the restitution is not good

These threshold values are entered during the model building and can be modified constantly by the operator.

- Sample spectrum (red curve)
- Restituted spectrum (green curve).
- Difference spectrum (blue curve). It is representative of restitution gap.
- Message on the restitution quality
  - "OK": restitution gap ≤ 4% or
  - "Warning": restitution gap > 4%. **Be careful to parameters concentration**

➢ ***Restituted spectrum***

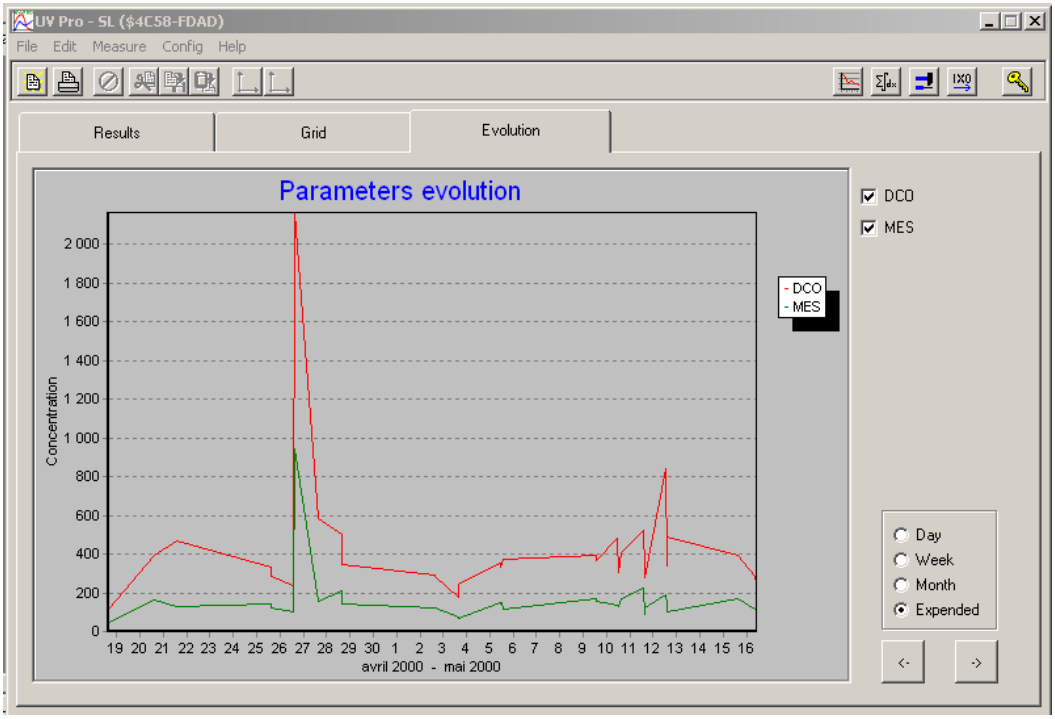
It is the theoretical spectrum of the sample built with the spectra of the model and the contribution coefficients calculated for each one. If the measured sample corresponds to the model used, then the sample spectrum and the restituted spectrum are entirely superimposed. In this case, the difference spectrum is flat.

➢ ***Restitution gap***

It is the difference between the sample spectrum and the restituted spectrum. More the spectrum is flat, better is the model.

7.2.3 "Evolution" index

In this configuration, it is possible to display the evolution of one or several parameters with the time.

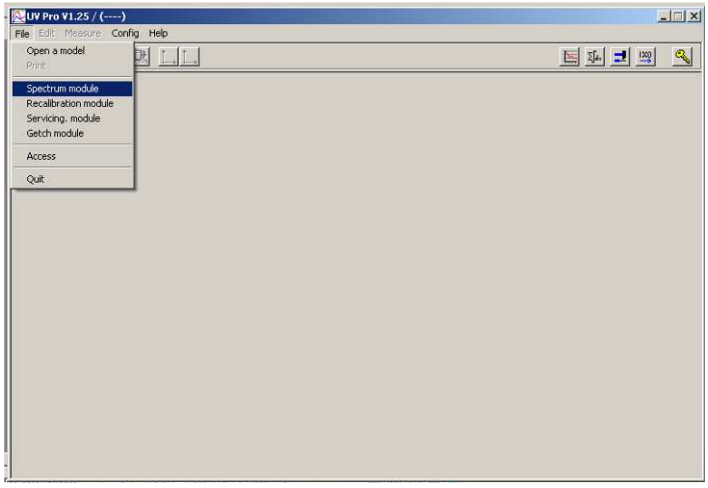


- Select one or several parameters (in the top right of the screen)
- Select the time over which the operator wishes to visualize the parameters (day, week, month, expended). By default, the evolution in a period of time of one or several parameters is displayed in expended mode.

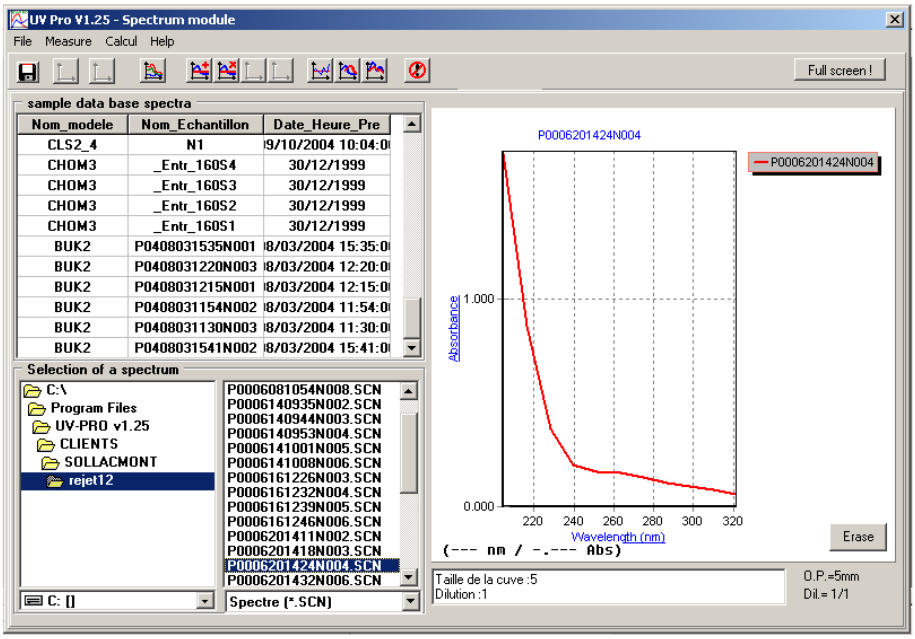
8 MEASURE AND SPECTRA TREATMENT

8.1 SCREEN DESCRIPTION

From the main display:



- Select “File” and “Spectrum module”. It displays



This screen is composed by 3 windows:

- **“Sample data base spectra” window:**

It contains samples spectra previously measured in the sub menu “Open a model”.

- **“Selection of a spectrum” window.**

This window allows selecting one or several spectra in a folder to display them.

➢ **"Spectra visualization" window**

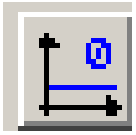
This window allows displaying one or several spectra with information (optical path, dilution ratio…).

8.2 SPECTRA MEASUREMENT:

8.2.1 Blank reading

First of all, take a baseline reading, which is usually run on **quartz** cuvette filled with "**clean**" distilled water. This step is referred to as «Zero».

- Install the cuvette inside the instrument.

- Click on  or select "Measure" and "Baseline"

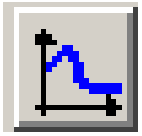
NOTE: If this operation is obvious on a spectrophotometer like ANTHELIE or Uvi Light, it is not the same with the analyzers.

- On PASTEL UV in stand alone mode, it is not necessary to perform a baseline because it is already saved in memory. If the PASTEL UV is directly used with UV-PRO software, the operator will not launch a measure if the baseline is not executed. So, the operator has to do a baseline with same quartz cuvette (O.P. 5 or 10 mm) that he uses to measure the sample.

- On the online analyzer, it is preferable to use the "Servicing Module" of UV-PRO software to realize specific measurement.

8.2.2 Measure

- Fill the cuvette with the sample (See hereafter the precautions to be taken).

- Click on  or select "Measure" and "Measure".

- Enter the cuvette size and the dilution ratio.

NOTE:
Dilution: **1** means there is **no** dilution.
Dilution: **2** means there is **1** sample volume for **1** distilled water volume
Dilution: **3** means there is **1** sample volume for **2** distilled water volumes
And so on.

- Click on “OK”.
The instrument measures the sample and displays its spectrum.
- Launch a “Deconvolution” calculation in order to have the parameters concentration.
Proceed the same way to measure other samples.

Precautions at the time of the measurement of the samples

- For the micropipette, use pipette tips whose diameter of the extremity is higher than 1 mm to avoid filtering TSS
- Aspire slowly and gradually the homogenized sample.
- Fill the cuvette by slowly driving back the sample on the cuvette wall.
- Wipe carefully the cuvette.
- BE CAREFUL TO THE FINGERS TRACES
- BE CAREFUL TO THE CONDENSATION IF THE SAMPLE IS COLD
- Shake the cuvette.
- insert the cuvette in its compartment.

8.3 SPECTRUM TREATMENT

8.3.1 Spectra presentation

There are different types of spectra:
- Spectra with “.SCN” extension. These spectra come from online analyzer or PASTEL UV after downloading. It is the format in which it will be necessary to convert the other spectra so that they can take part in the development of the models.
- **Spectra with “.SPE” extension.** These spectra have been measured with “ANTHELIE senior” or “ANTHELIE Junior” using DOS software. They cannot be used in the development of the models and they must be converted in spectra with “.SCN” extension.
- **Spectra with “.SPT” extension**. They are spectra rough without additional information like dilution and optical path. They are not usable for the creation of model and must be converted into spectrum with "SCN" extension.
- **Spectra with “.ECH” extension.** This format is not used any more.

8.3.2 Spectra visualization

“Sample data base spectra” window:
To display one of these spectra, double click on the line including this spectrum. To superimpose several spectra, double click on whished spectra.
NOTE: To delete spectra out of this window, it is necessary to come back inside menu “Open a model”, then to open the model which has been used for these spectra acquisition and delete them out the main window.

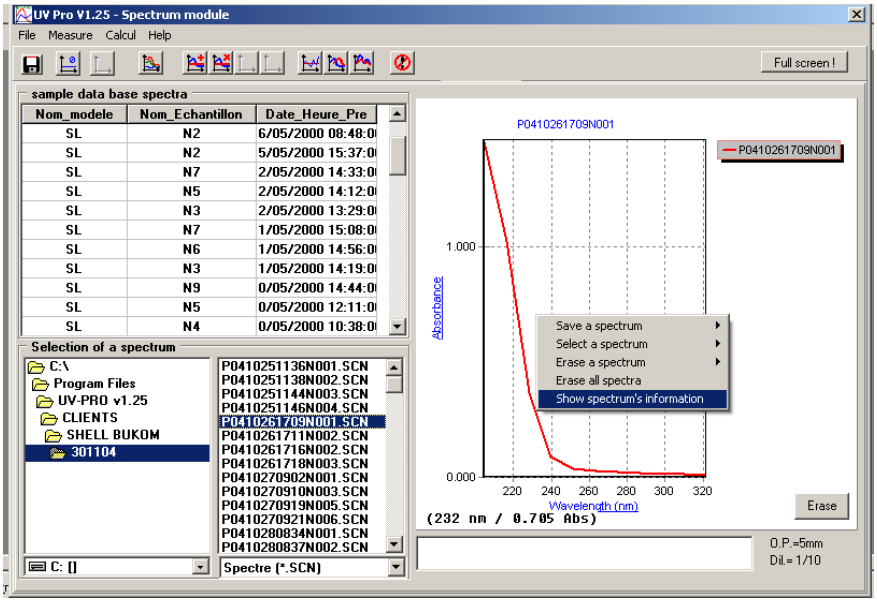
“Selection of a spectrum” window.
To display one of these spectra, select the directory where they are saved and click on the whished spectrum.
Inside the window, under the spectrum, is displayed spectrum traceability information (Optical path, dilution ratio…).
To superimpose several spectra, click on the first one, validate with ”Enter” key, click on the second one, validate with enter “key’ and so on.

To delete all spectra click on “Erase.

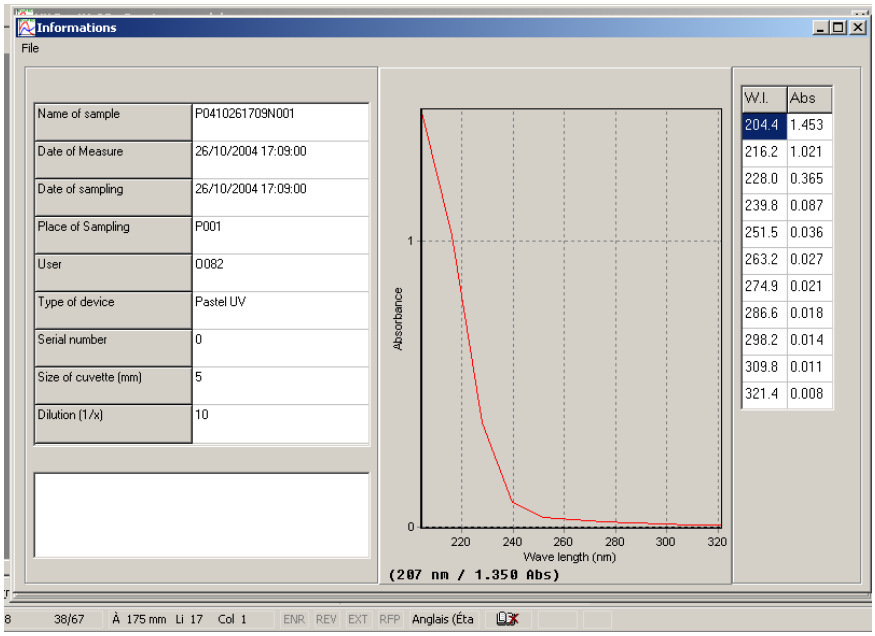
NOTE: It is possible to superimpose 20 spectra maximum; over this number the message “Too many spectra on the screen” will be displayed.

8.3.3 Spectra information

In order to have information about a spectrum, proceed as follows:
- select the spectrum.
- Set the mouse cursor inside the spectrum window
- Click on the mouse right button



- Select “Show spectrum information”.
It displays:

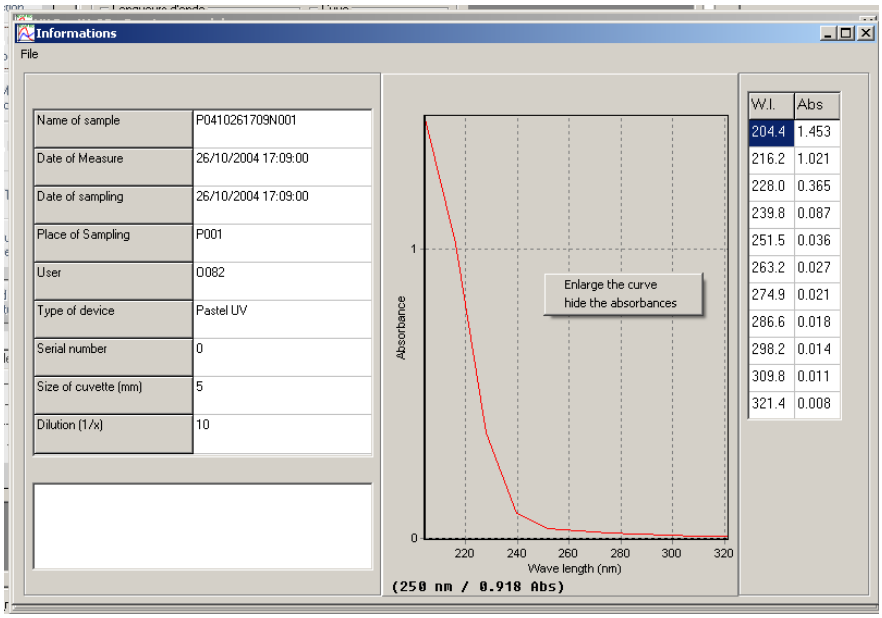


The following information is available:
- Sample name.
- Measure date and time.
- Sampling date and time.
- Name or code of the sampling site.

- Name or code of the operator.
- Instrument type
- Serial number (not available).
- Cuvette size.
- Dilution ratio.

This information is memorized automatically when the operator uses a PASTEL UV or an online analyzer. This information is entered by the operator when he uses an ANTHELIE Senior, an ANTHELIE Junior or an Uvi Light

On the right of the screen are displayed the wavelengths and corresponding absorbances of the spectrum.
The measuring step is around 12 nm for PASTEL UV or online analyzer and 1 nm for ANTHELIE Senior, ANTHELIE Junior or Uvi Light spectrophotometer.



In the spectrum window, by clicking with mouse right button, two possibilities are available: enlarge the curve window or hides the absorbances.

8.3.4 Zoom

To make a zoom on a specific part of the curve:
- Set the mouse cursor on the left upper corner of part to be expended.
- Press the mouse left button.
- Maintain this key pushed and move the mouse cursor on the right lower corner of the part to be expended.
- Release the button.

The expended part of the curve will be displayed in place of the curve.

To go back to the original curve:
- Set the mouse cursor on the lower right corner of the expended curve
- Press the mouse left button.
- Maintain this key pushed and move the mouse cursor on the left upper corner of the expended curve.
- Release the button.

The original curve is then displayed.

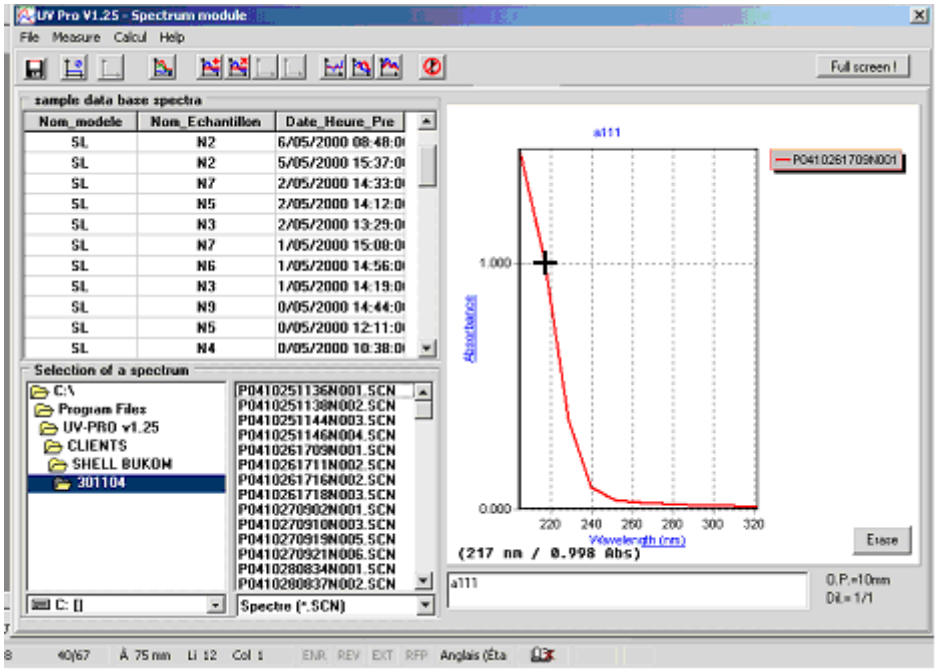
8.3.5 Spectrum shifting in displaying window

To shift the spectrum inside its displaying window:
- Set the mouse cursor in the middle of the displaying window.
- Press the mouse right button.

- Maintain this key pushed and move the mouse cursor.
The curve moves following the movements of the mouse.

To find the place of the spectrum:
- Set the mouse cursor in the middle of the displaying window.
- Press the mouse left button.
- Maintain this key pushed and move the mouse cursor on the left upper corner of spectrum.
- Release the button.
The curve goes back to the original place.

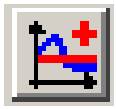
8.3.6 *Absorbance reading*

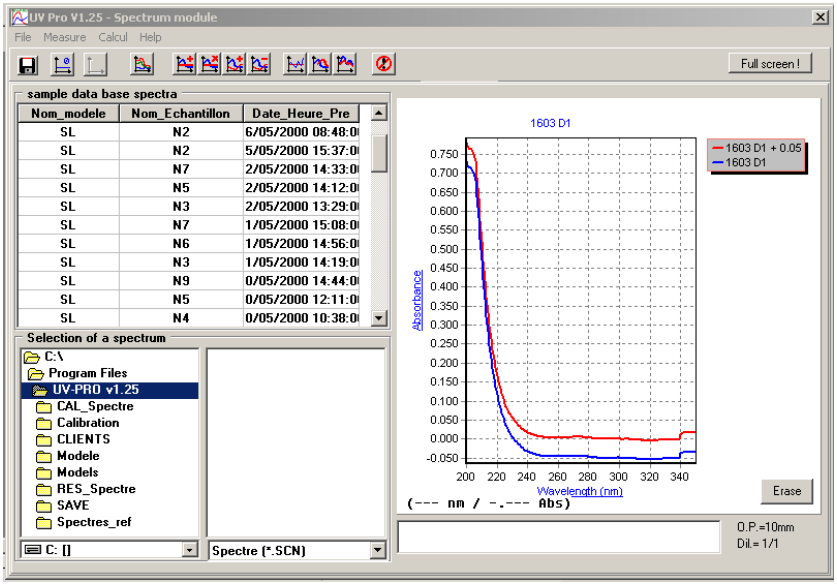


- Set the mouse cursor on the spectrum. The wavelength and the corresponding absorbance are displaying under the spectrum.

8.3.7 *Addition of a constant to the spectrum*

To add a positive or negative constant to a spectrum:
- Display the spectrum.

- Click on  or select “Calcul” and “Add a constant”.
- Enter the constant value.
- Validate.

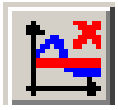


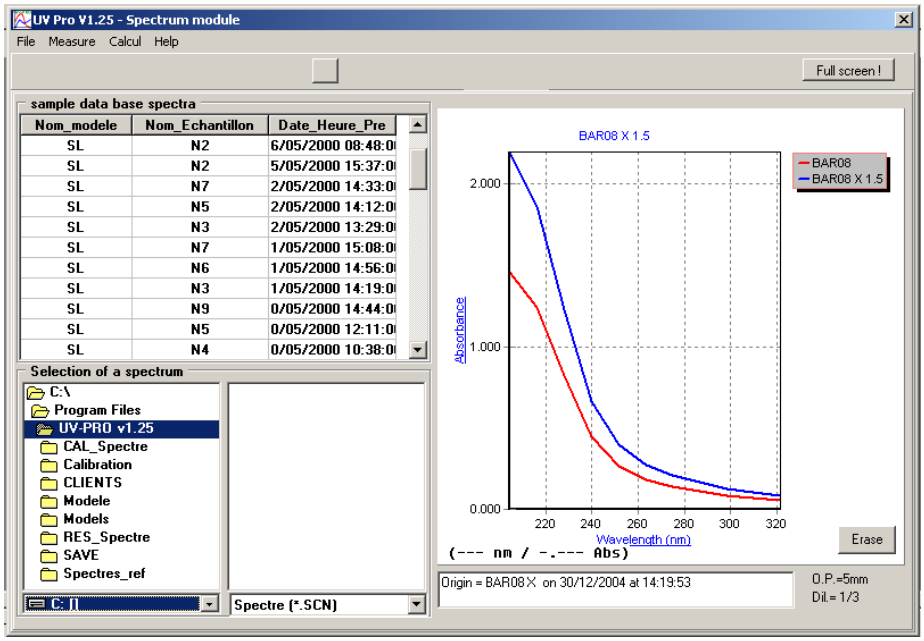
Are displayed:
- Original spectrum.
- Shifted spectrum
- Names of both spectra

NOTE: The new spectrum has, by default, the name of the original spectrum added with "+ constant value". The operator can save it with a new name.

8.3.8 Multiplication of a curve by a constant

To multiply a spectrum by a constant:
- Display the spectrum.

- Click on  or select "Calcul" and "Multiply with a constant".
- Enter the constant value.
- Validate.



Are displayed:
- Original spectrum.
- Multiplied spectrum
- Names of both spectra

NOTE: The new spectrum has, by default, the name of the original spectrum added with “X constant value”. The operator can save it with a new name.

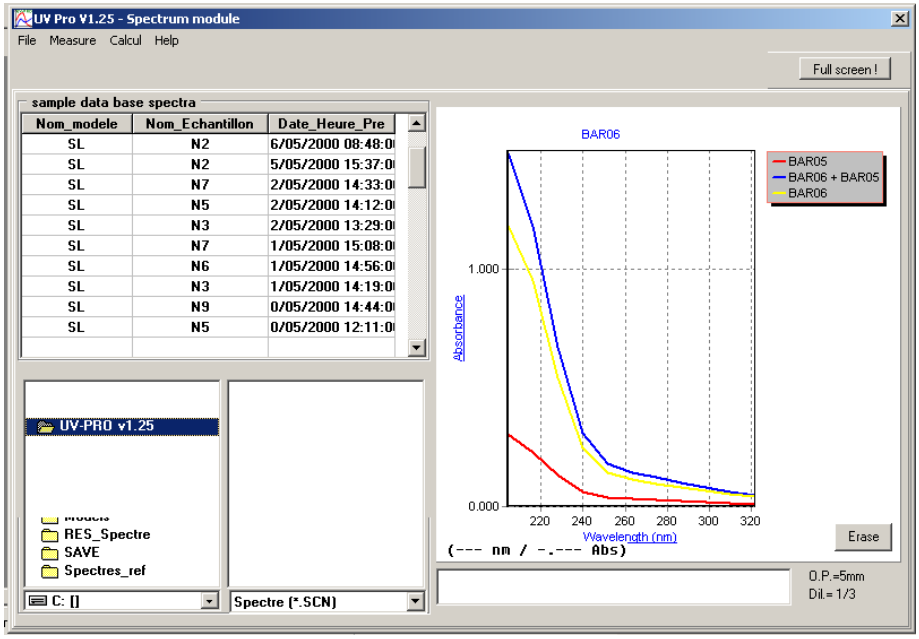
8.3.9 Addition and subtraction of spectra

To add two spectra together:
- Select the first spectrum.
- Validate.

Select the second spectrum.

- Click on or select “Calcul” and “Addition of spectra”.

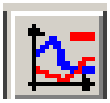
The result of this operation is automatically displayed.



Are displayed:
- Original spectra.
- Resultant spectrum
- Names of the three spectra

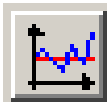
NOTE: The new spectrum has, by default, the name “Spectrum xxx + Spectrum yyy”. The operator can save it with a new name.

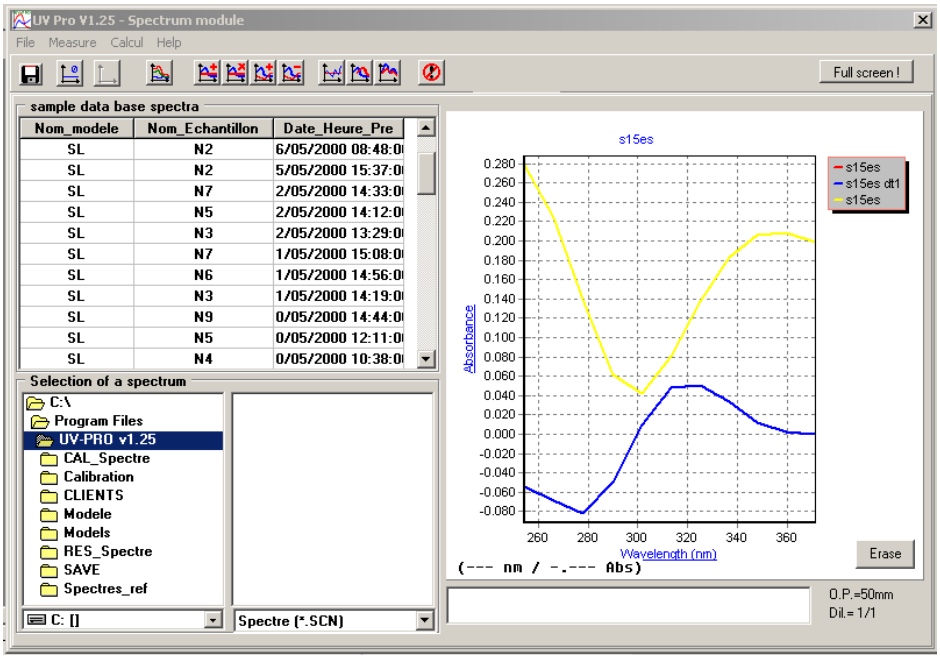
To subtract one spectrum from another spectrum, proceed as for spectra addition, but click on

 or select “Calcul” and “subtraction of spectra”.

8.3.10 Spectrum derivative

To derivate a spectrum:
- Display the spectrum.
- Validate

- Click on  or select “Calcul” and “Derive of spectrum”.
- Enter derivative order.
- Validate.

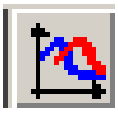


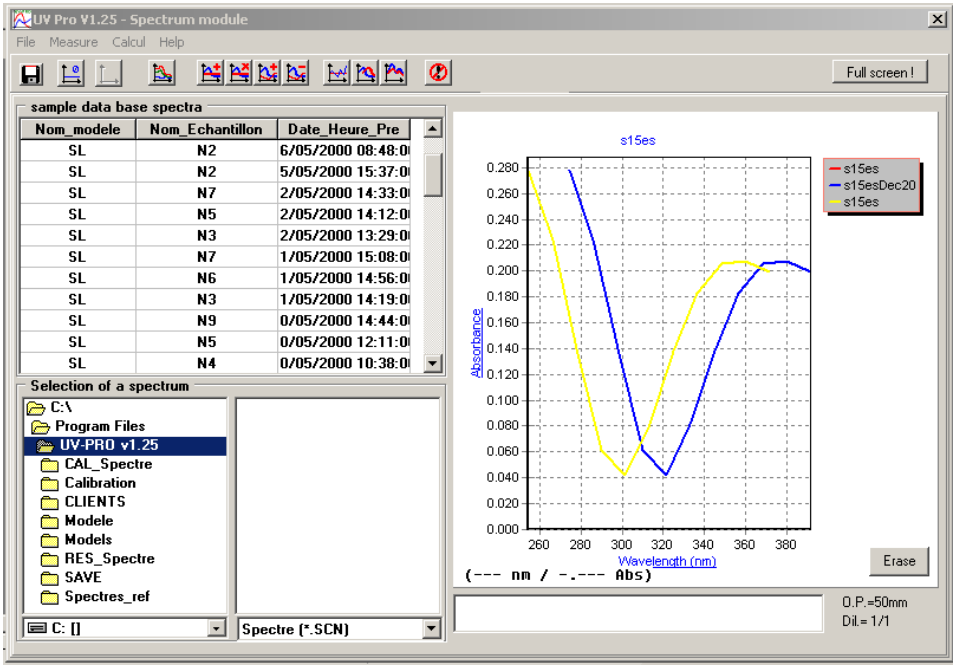
Are displayed:
- Original spectra.
- Derivative spectrum
- Names of both spectra

NOTE: The new spectrum has, by default, the name of the original spectrum added with “dtx” (x is the derivative order). The operator can save it with a new name.

8.3.11 Wavelength shifting of a spectrum

To make a wavelength shifting on a spectrum:
- Display the spectrum.
- Validate.

- Click on  or select “Calcul” and “Shift a spectrum”.
- Enter shifting value (positive or negative) in nanometers.
- Validate.



Are displayed:
- Original spectra.
- Shifting spectrum
- Names of both spectra

NOTE: The new spectrum has, by default, the name of the original spectrum added with "+/- shifting value". The operator can save it with a new name.

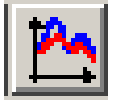
8.3.12 Spectrum smoothing

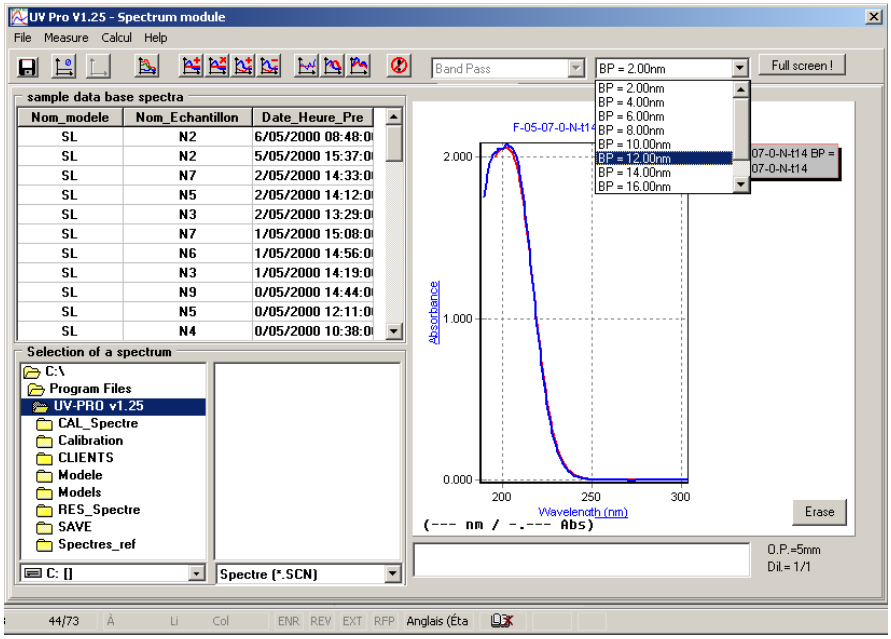
The spectrum smoothing can be done following three different ways

With spline function
It is a smoothing of the spectrum to more close to the real curve.

By increasing the band-width
This smoothing is used when the operator wants to transfer on an analyzer, a model built with spectra coming from laboratory spectrophotometer. It necessary to take the band-widths difference (2 or 5 nm for ANTHELIE or Uvi Light and 12 nm for online analyzer and PASTEL UV).of instruments into account

By quadratic smoothing
This smoothing uses the quadratic regression

To smooth a spectrum:
- Display the spectrum.
- Click on  or select "Calcul" and "Spectrum smoothing".
- Enter smoothing type (see explanation above)
- Select the band width if the operator has selected this smoothing mode.
- Validate.

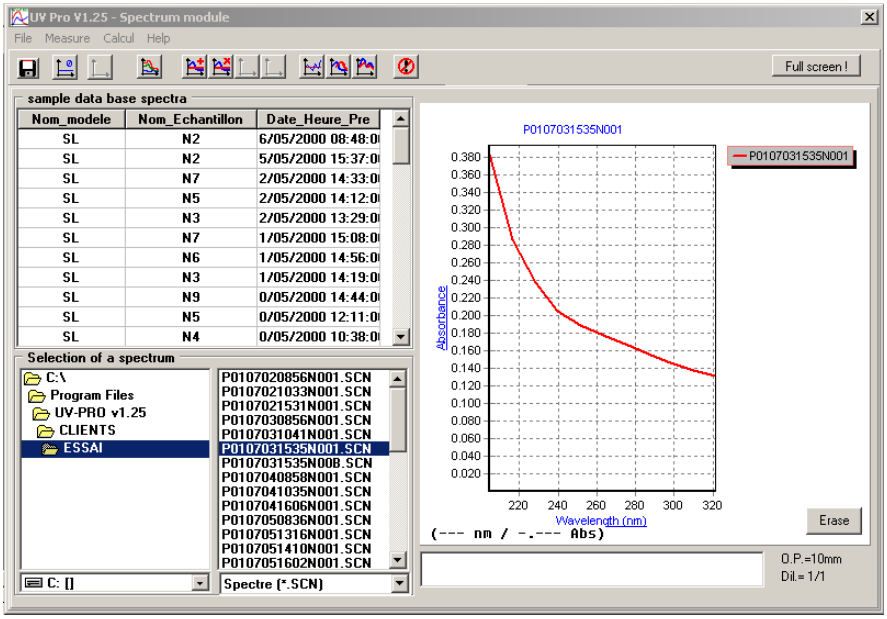


Are displayed:
- Original spectra.
- Smoothing spectrum
- Names of both spectra

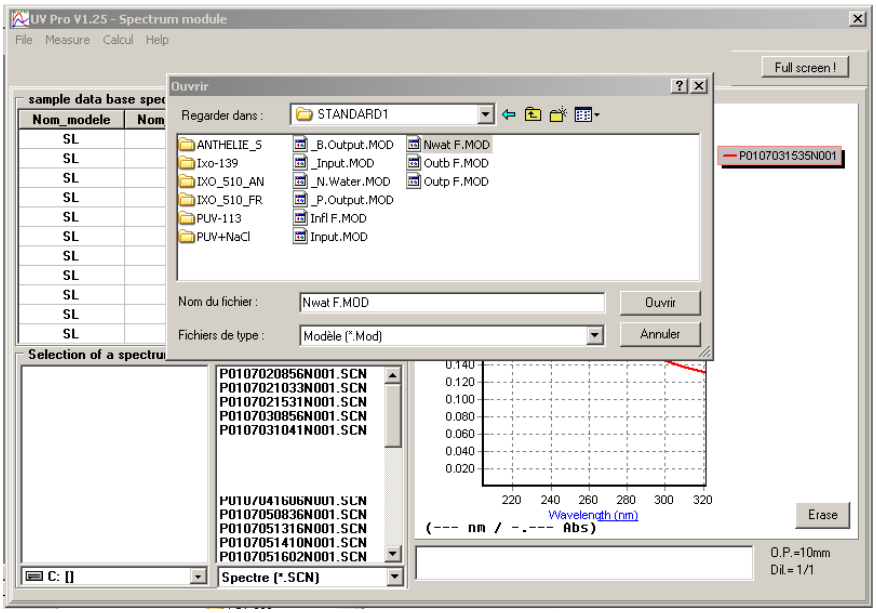
NOTE: The new spectrum has, by default, the name of the original spectrum added with “BP=xx nm”. The operator can save it with a new name.

8.3.13 Spectrum deconvolution

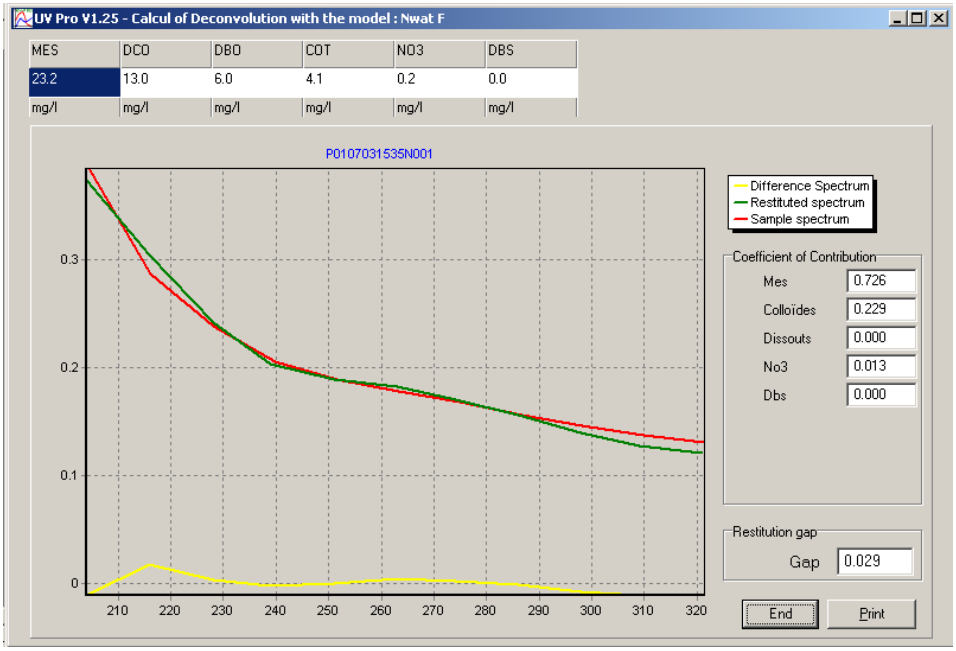
The spectrum deconvolution allows, from a selected model, to calculate the wishes parameters values (See chapter 4).
- Select a spectrum.



- Click on or select « Calcul » and «Deconvolution».



A window is displayed with different model.
- Select the model which is corresponding to the measured sample.
- Validate



Are displayed:
- Values for every measured parameters.
- Sample spectrum (red curve).
- Restituted spectrum (green curve).
- Difference spectrum (in yellow curve). It is representative of restitution gap.
- Each spectrum contribution for parameters calculation (5 values on the right).
- Restitution gap (bottom right value).

➢ ***Restituted spectrum***

It is the theoretical spectrum of the sample built with the spectra of the model and the contribution coefficients calculated for each one. If the measured sample corresponds to the model used, then the sample spectrum and the restituted spectrum are entirely superimposed. In this case, the difference spectrum is flat.

➢ ***Restitution gap***

It is the difference between the sample spectrum and the restituted spectrum. More the spectrum is flat, better is the model.

➢ ***Contribution coefficients***

They are given by the mode of calculation "Déconvolution". They define the contribution of the each spectrum value in the final calculation of the parameters.
Example:
- The nitrate value of the nitrate spectrum is, in this model, equal to 16.7 mg/l
- The contribution coefficient for the nitrate spectrum is equal to 0.013.
- The nitrate value for this sample will be equal to 16.7 x 0.013 = 0.21 mg/l.

➢ ***Restitution gap***

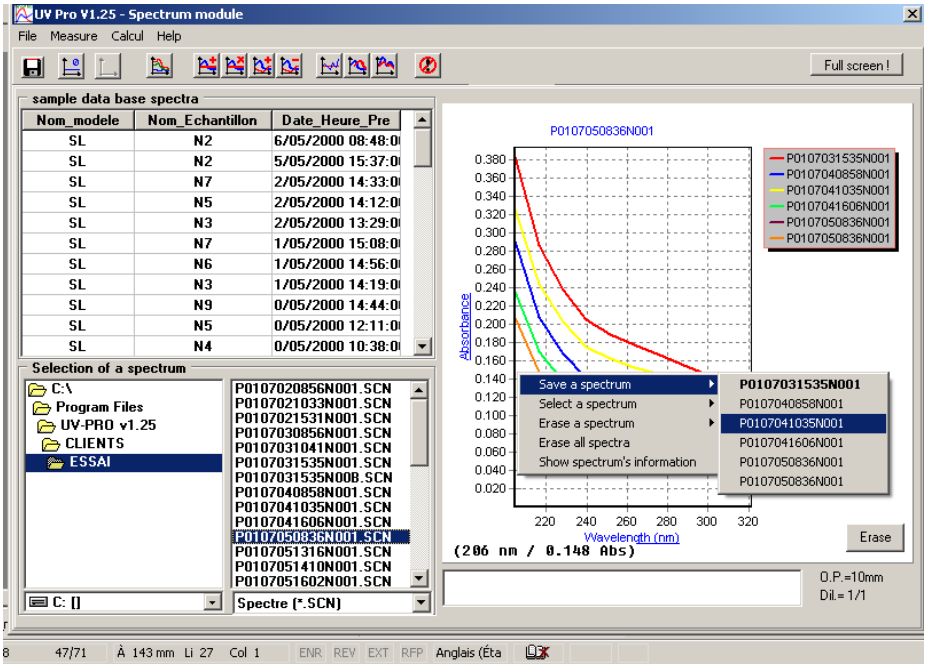
It is given by the calculation of the surface existing between the sample spectrum and the restituted spectrum. This gap can be positive or negative according to the position of the curves one compared to the other.
It is expressed in thousandth.
Beyond 0.040 (4%), the restitution between the two spectra is not perfect, the model used does not correspond completely to the measured sample: it is thus advisable to consider the results calculated with attention.

8.3.14 Spectra registration

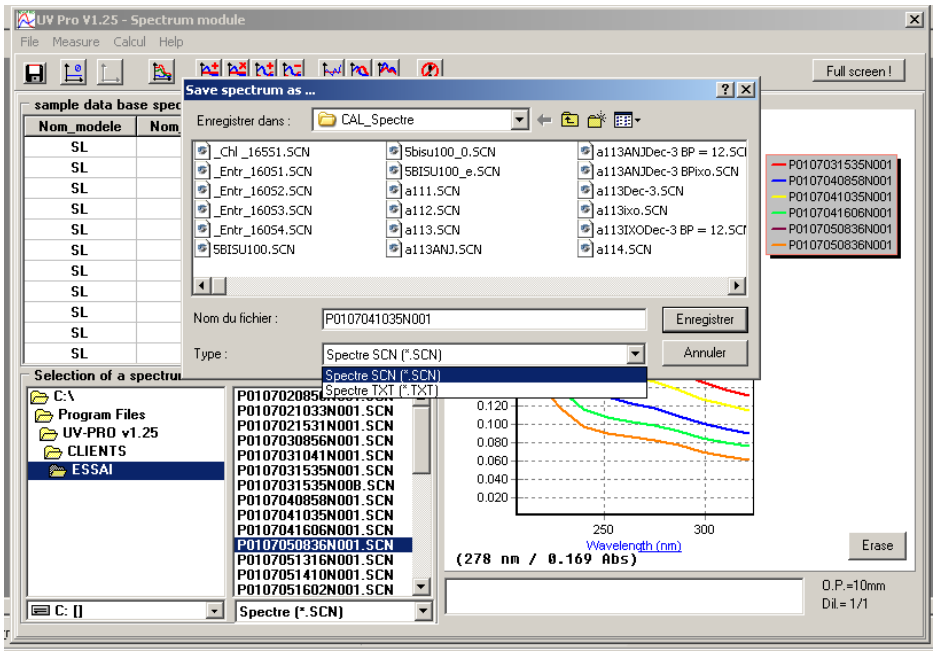
There three standards for spectra registration:
- Spectra with ".SCN" extension.
- Spectra with ".TXT" extension.
- Spectra with ".XLS" extension.

8.3.14.1 Spectra with ".SCN" extension

1) Direct way

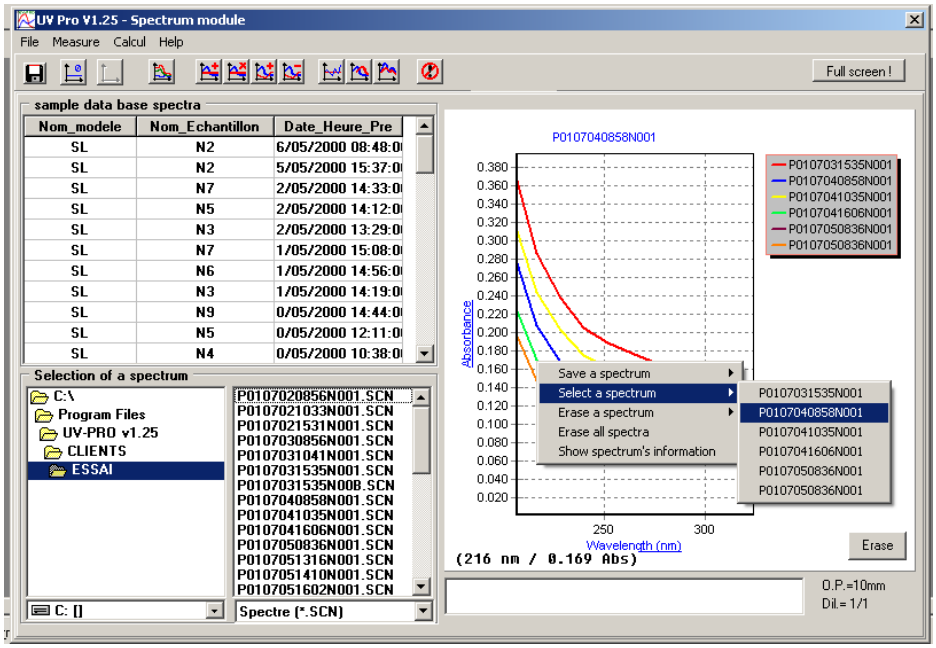


- Select the spectrum.
- Place the mouse cursor in the middle of the spectra window.
- Press mouse right button.
- Select "Save a spectrum".
- Select the spectrum with mouse cursor.
- Validate.

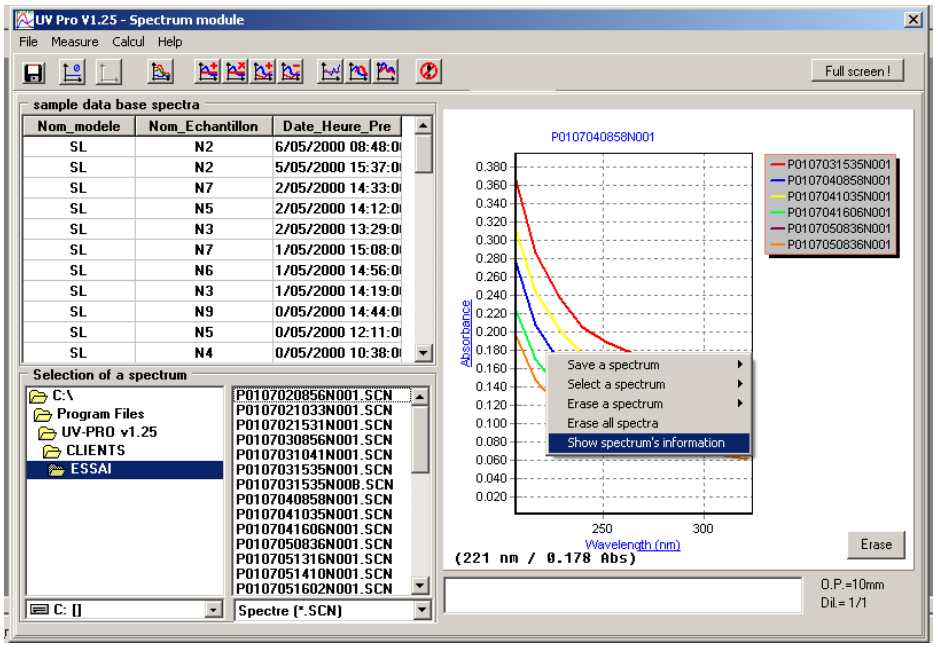


- Select the directory where the spectrum will be registered.
- Select ".SCN" extension.
- Give a name to the spectrum.
- Validate.

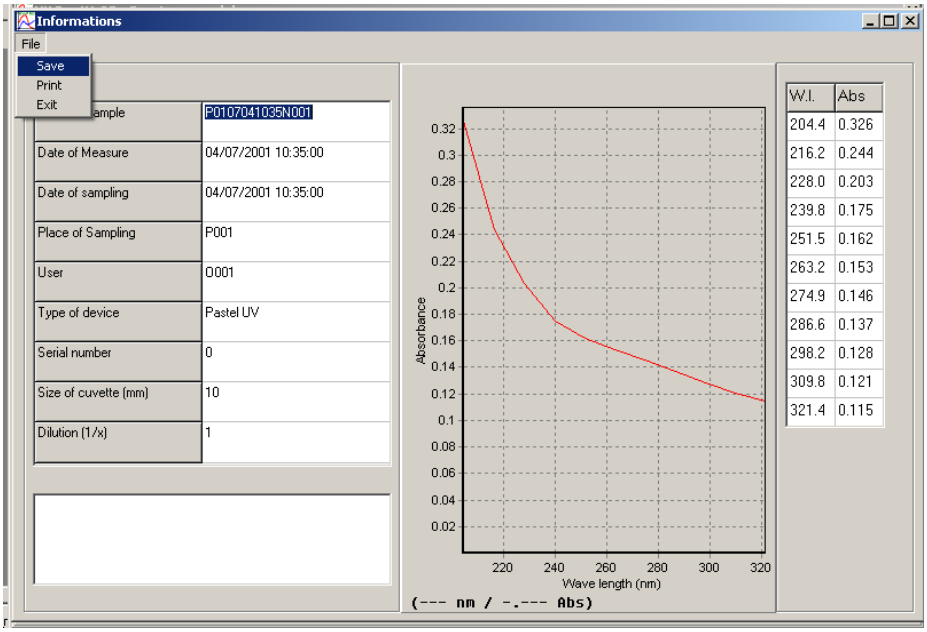
2) Indirect way



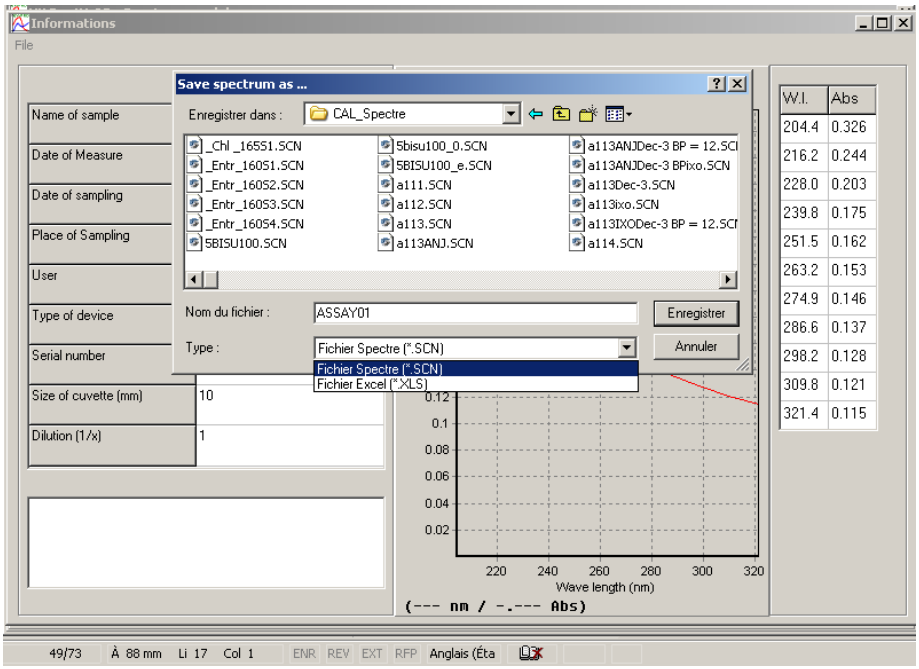
- Select the spectrum.
- Place the mouse cursor in the middle of the spectra window.
- Press mouse right button.
- Select "Select a spectrum".
- Select the spectrum.
- Validate.



- Place the mouse cursor in the middle of the spectra window.
- Press mouse right button.
- Select “Show spectrum information”.
- Validate.



- Select “File” and ‘Save”.

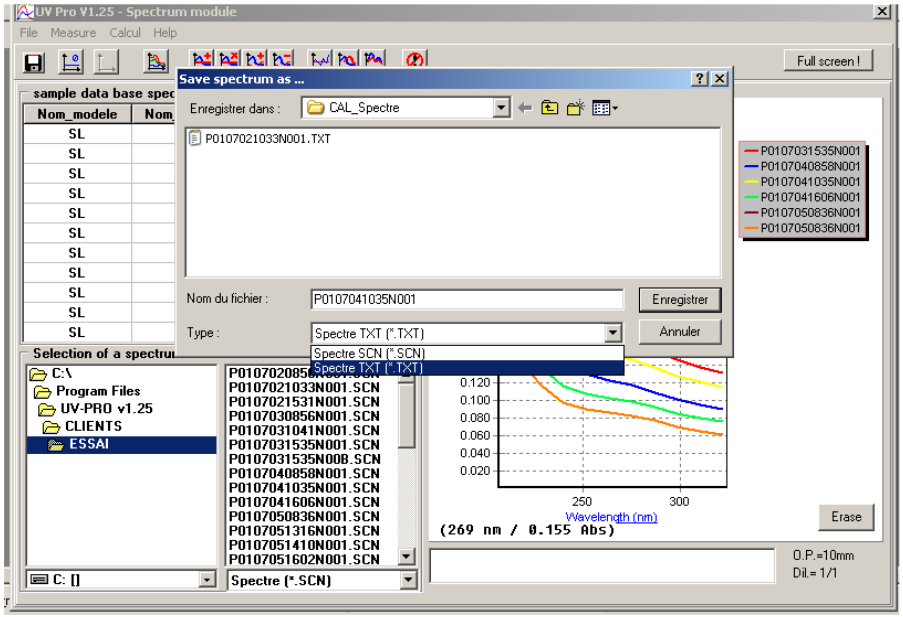


- Select the directory where the spectrum will be registered.
- Select ".SCN" extension.
- Give a name to the spectrum.
- Validate.

8.3.14.2 Spectra with ".TXT" extension

It is a text format. This format is exploitable in EXCEL but after having passed through the assistant of data importation. There are only the raw data (Wavelengths/Absorbances) which are imported.

To save a spectrum with ".TXT" extension, proceed like previously in the direct way.

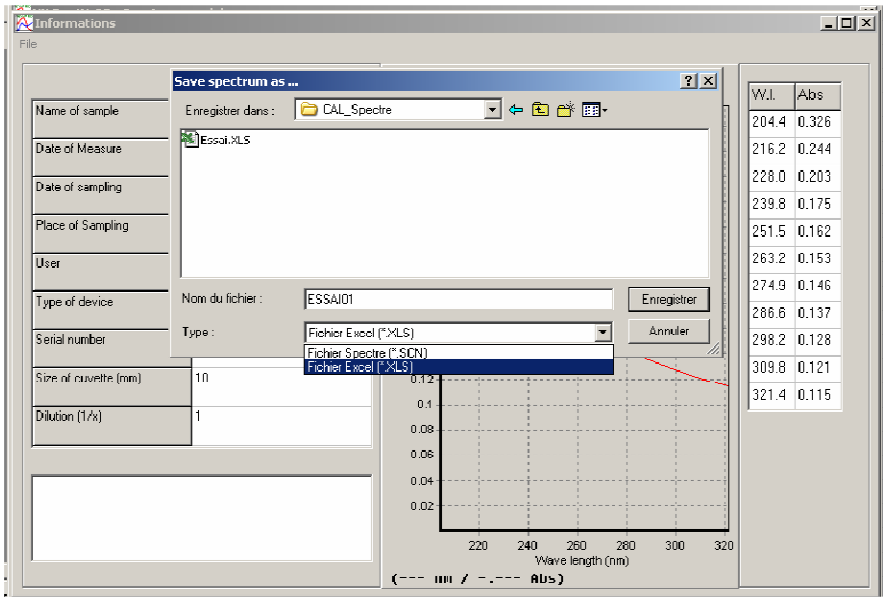


- Select the directory where the spectrum will be registered.
- Select ".TXT" extension.
- Give a name to the spectrum.
- Validate.

8.3.14.3 Spectra with ".XLS" extension

It is an EXCEL format. This format is directly exploitable in EXCEL. The information (spectrum name, measure date, operator code…) are imported in the same time as data (Wavelengths/Absorbances).

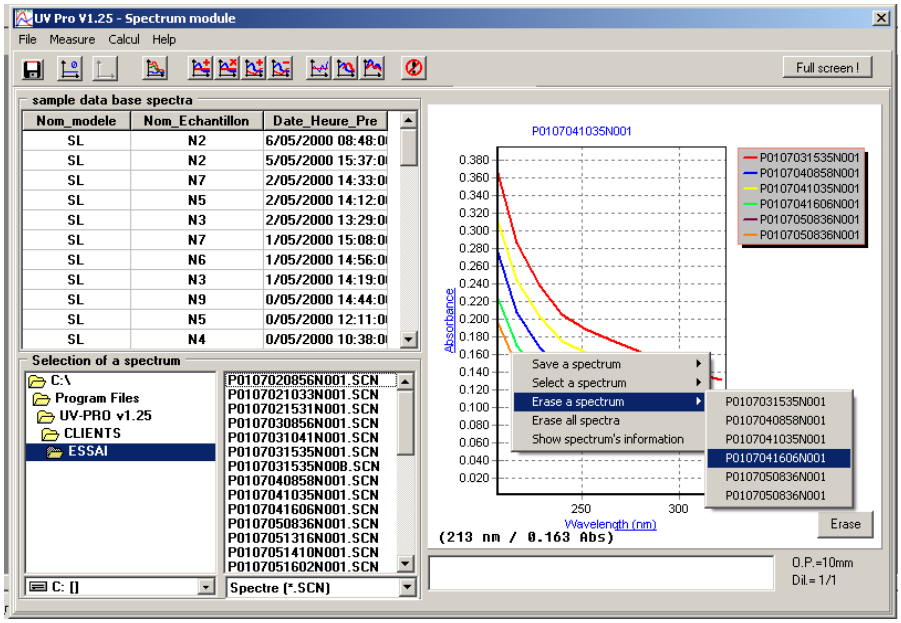
To save a spectrum with ".XLS" extension, proceed like previously in the indirect way.



- Select the directory where the spectrum will be registered.
- Select ".XLS" extension.
- Give a name to the spectrum.
- Validate.

8.3.15 Spectra deletion

When they are several spectra in the spectra window, it is possible to delete selectively one or several spectra.



- Place the mouse cursor in the middle of the spectra window.
- Press mouse right button.
- Select “Erase a spectrum”.
- Select the spectrum.
- Validate.

- Renew the operation to remove other spectra.

To delete all spectra:
- Click on button “Erase” in the bottom right part of the screen
or
- Place the mouse cursor in the middle of the spectra window.
- Press mouse right button.
- Select “Erase all spectra”.
- Validate.

9 MODEL CREATION

9.1 PRIMILARY INFORMATION

Before to built a new model, different operation are necessary.

➢ ***Sample drawing***

To realize a model characteristic of the effluent to be measured, the samples, whose spectra will be used to build this model, must represent all the forms that the effluent can take.
- Samples drew during the night, the weekend or holidays (reduction of activity or manufacture).
- Samples drew in rainy weather or of storm (dilution of the effluent).
- Samples drew during a long period without rain (concentration of the effluent).
- Samples drew at the time of a "pollution" of the effluent only if this one occurs regularly.
- Samples drew for "normal" periods of operation

One needs a minimum of 20 spectra.

➢ ***Spectrum acquisition***

At the time of the spectrum acquisition, do not forget to enter correctly following information when they are required:
- Optical path.
- Dilution ratio.
- Wavelength range.

This information is saved with the spectra and is taken into account automatically at the time of the model development.

➢ ***Measure of parameters using a reference method***

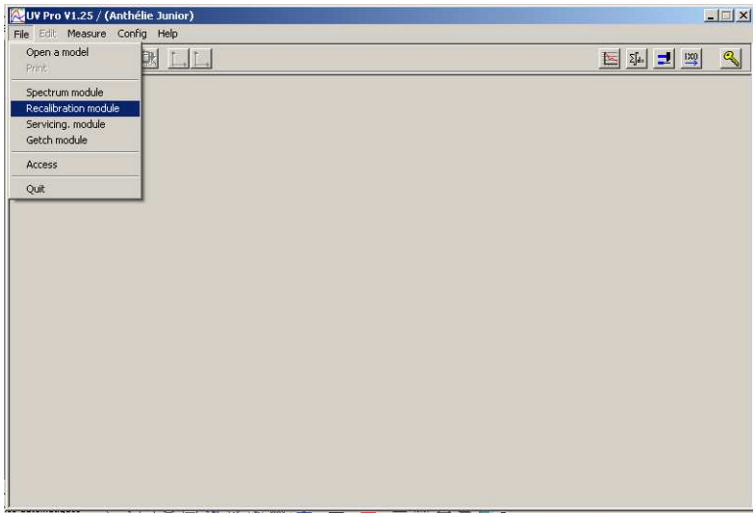
Send to the laboratory the samples, which one acquired of the spectra, in order to measure the parameters sought by a reference method.

IMPORTANT: The samples measured by the spectrophotometer or the analyzer and those sent to the laboratory must be exactly the same ones. It also very important to note exactly the day and the hour registered on the display of PASTEL UV or the online analyzer, because these are the information which is used to code the name of the spectrum at the time of its safeguard.

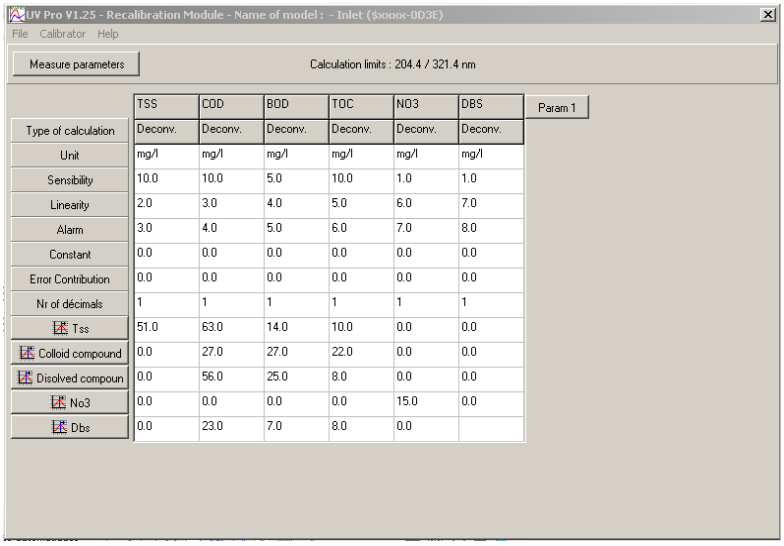
9.2 MODEL DESCRIPTION

Like it was described in chapter 4, a model consists of several elementary spectra called reference spectra whose sum represents the image of the sample at the moment T.
At the time of the constitution of the model, these spectra are chosen by the operator or automatically calculated using the "calibrator" or mixed one of the two methods.
The operator or calculation associates these spectra a value for the parameters to measure. This value will be taken into account at the time of the deconvolution calculation by a coefficient of contribution for each one of these spectra.

From mean screen:



- Select “File” and “Recalibration module”
- Open a model (Example: Inlet of water treatment plant)



	TSS	COD	BOD	TOC	NO3	DBS
Type of calculation	Deconv.	Deconv.	Deconv.	Deconv.	Deconv.	Deconv.
Unit	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Sensibility	10.0	10.0	5.0	10.0	1.0	1.0
Linearity	2.0	3.0	4.0	5.0	6.0	7.0
Alarm	3.0	4.0	5.0	6.0	7.0	8.0
Constant	0.0	0.0	0.0	0.0	0.0	0.0
Error Contribution	0.0	0.0	0.0	0.0	0.0	0.0
Nr of décimals	1	1	1	1	1	1
Tss	51.0	63.0	14.0	10.0	0.0	0.0
Colloid compound	0.0	27.0	27.0	22.0	0.0	0.0
Disolved compoun	0.0	56.0	25.0	8.0	0.0	0.0
No3	0.0	0.0	0.0	0.0	15.0	0.0
Dbs	0.0	23.0	7.0	8.0	0.0	

Each reference spectrum (TSS, Colloid compound, dissolved compound, Nitrate, anionic detergent) has a value (which can be equal to zero) for each calculated parameter (TSS, COD, BOD, TOC, NO3, DBS) See calculation example on the following page.

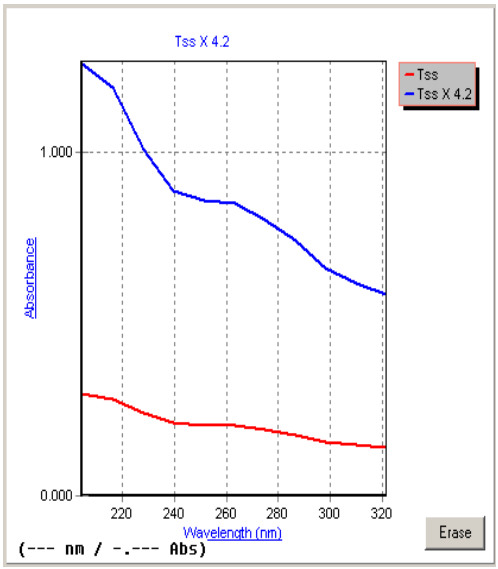
The principle is similar what ever are the measured parameters, and the number reference spectra used.
The number of reference spectra depends on the type of instrument used:
3 to 5 for PASTEL UV and online analyzer
3 to 8 for ANTHELIE and Uvi Light.

Example of calculation using the model "Inlet of water treatment plant".

$SP_{sam} = C_1SP_1 + C_2SP_2 + C_3SP_3 + C_4SP_4 + C_5SP_5$
Calculation of C_1, C_2, C_3, C_4, C_5 by deconvolution

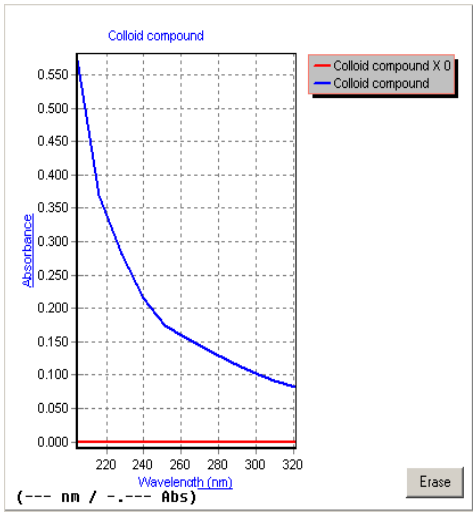
C_1 =4.2
C_2 = 0.0
C_3 = 2.2
C_4 = 0.146
C_5 = 0.0

SP_1 = TSS spectrum
SP_2 = Colloid compound spectrum
SP_3 = Dissolved compound spectrum
SP_4 = Nitrate spectrum
SP_5 = Anionic detergent spectrum (DBS)



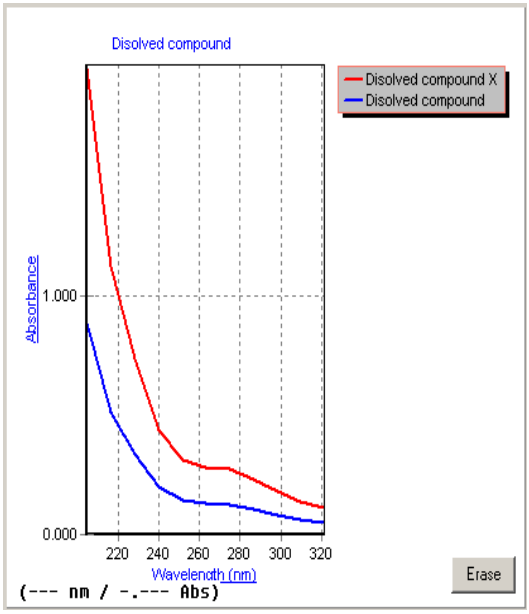
TSS
SP_1:
TSS = 51 mg/l
COD = 63 mg/l
BOD = 14 mg/l
TOC = 10 mg/l
No3 = 0.0 mg/l
DBS = 0.0 mg/l

C_1 = 4.2
SP_1 x 4.2 :
TSS = 214.2 mg/l
COD = 264.6 mg/l
BOD = 58.8 mg/l
TOC = 42 mg/l
No3 = 0.0 mg/l
DBS = 0.0 mg/l

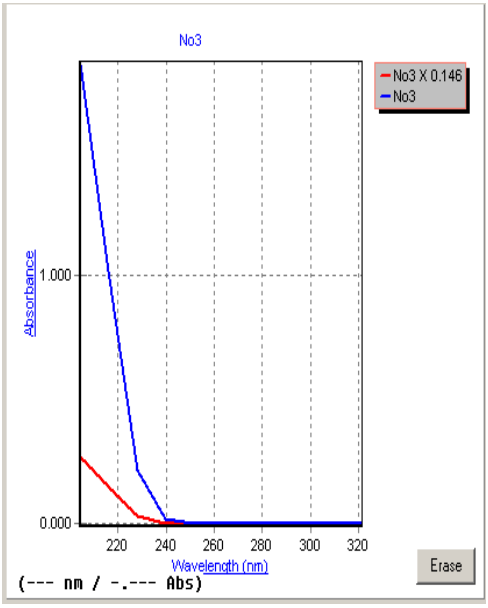


COLLOID COMPOUND
SP_2:
TSS = 0.0 mg/l
COD = 27 mg/l
BOD = 27 mg/l
TOC = 22 mg/l
No3 = 0.0 mg/l
DBS = 0.0 mg/l

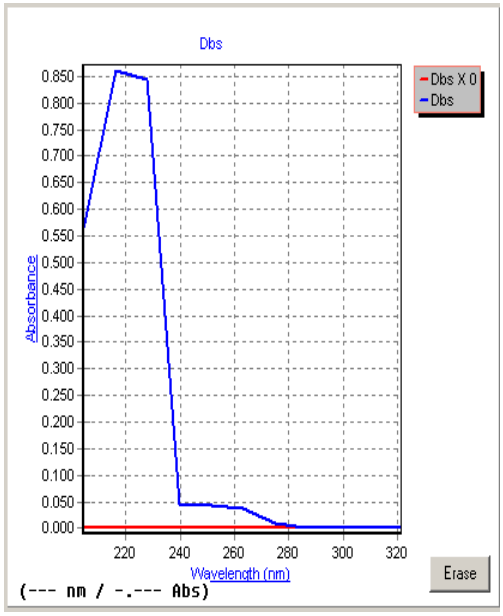
C_2 = 0.0
SP_2 x 0.0
TSS = 0.0 mg/l
COD = 0.0 mg/l
BOD = 0.0 mg/l
TOC = 0.0 mg/l
No3 = 0.0 mg/l
DBS = 0.0 mg/l



DISSOLVED COMPOUND	**C_3 = 2.2**
SP_3:	SP_3 x 2.2
TSS = 0.0mg/l	TSS = 0.0mg/l
COD = 56 mg/l	COD = 123.2 mg/l
BOD = 25 mg/l	BOD = 55 mg/l
TOC = 8 mg/l	TOC = 17.6 mg/l
No3 = 0.0 mg/l	No3 = 0.0 mg/l
DBS = 0.0 mg/l	DBS = 0.0 mg/l

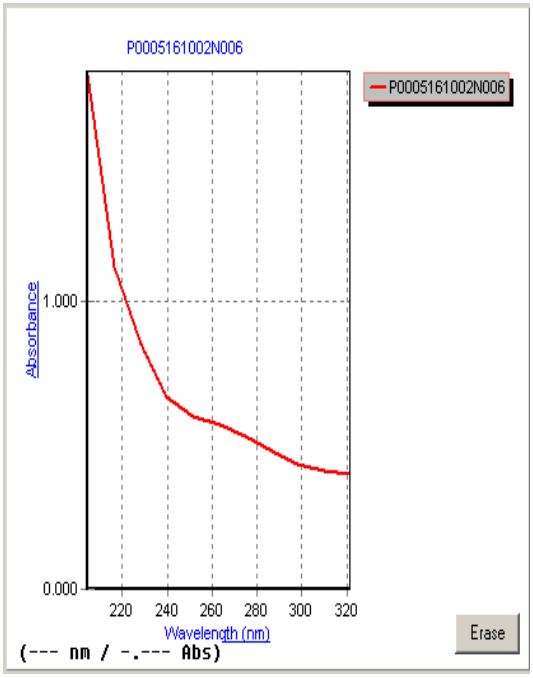


NITRATE	**C_4 = 0.146**
SP_4:	SP_4 x 0.146
TSS = 0.0mg/l	TSS = 0.0mg/l
COD = 0.0 mg/l	COD = 0.0mg/l
BOD = 0.0mg/l	BOD = 0.0 mg/l
TOC = 0.0 mg/l	TOC = 0.0 mg/l
NO3 = 15 mg/l	NO3 = 2.19 mg/l
DBS = 0.0 mg/l	DBS = 0.0 mg/l



DETERGENT (DBS)
SP_5:
TSS = 0.0 mg/l
COD = 23 mg/l
BOD = 7 mg/l
TOC = 8 mg/l
No3 = 0.0 mg/l
DBS = 25 mg/l

C_5 = 0.0
SP_5 x 0.0
TSS = 0.0 mg/l
COD = 0.0 mg/l
BOD = 0.0 mg/l
TOC = 0.0 mg/l
No3 = 0.0 mg/l
DBS = 0.0 mg/l

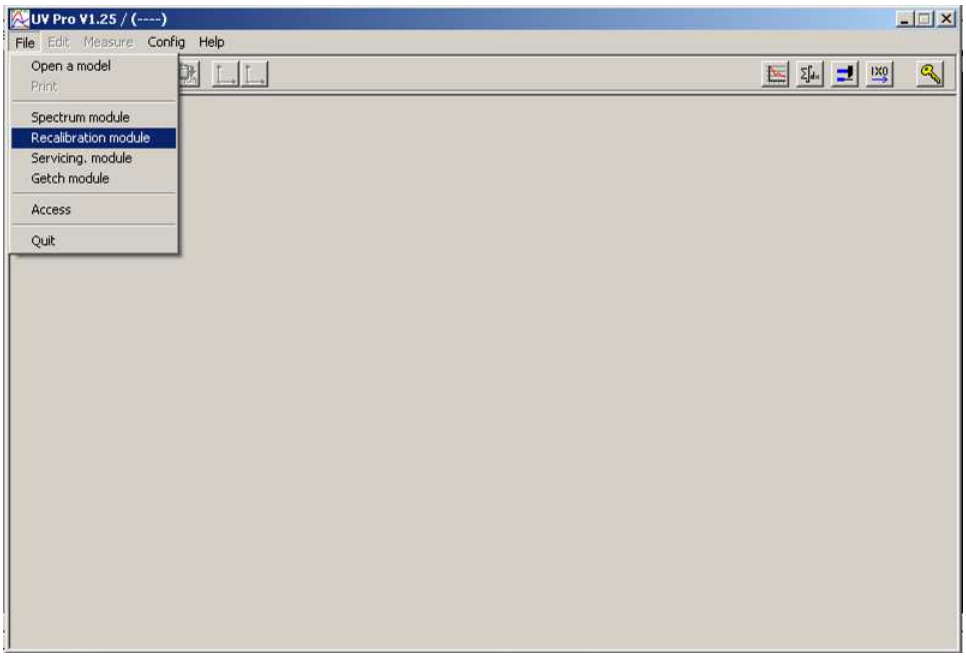


SP_{SAM} = (4.2) x SP_1 + (0.0) x SP_2 + (2.2) x SP_3 + (0.146) x SP_4 + (0.0) x SP_5

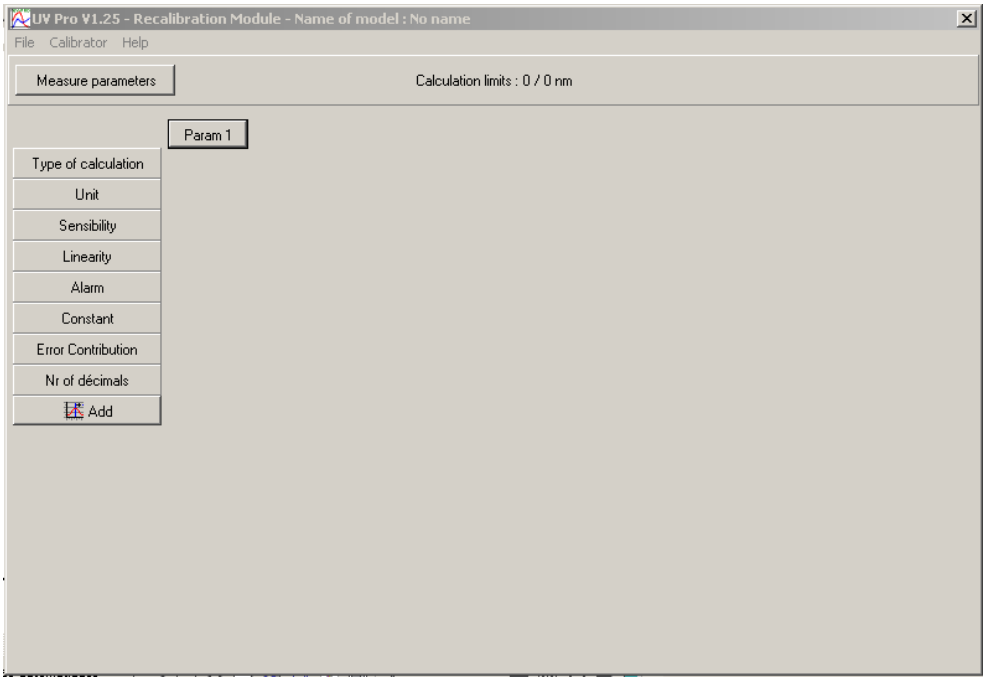
TSS =	214.2 + 0.0 + 0.0 + 0.0 + 0.0	**= 214.2 mg/l**
COD =	264.6 + 0.0 + 123.2 + 0.0 + 0.0	**= 387.8 mg/l**
BOD =	58.8 + 0.0 + 55 + 0.0 + 0.0	**= 113.8 mg/l**
TOC =	42 + 0.0 + 17.6 + 0.0 + 0.0	**= 59.6 mg/l**
NO3 =	0.0 + 0.0 + 0.0 + 2.19 + 0.0	**= 2.19 mg/l**
DBS =	0.0 + 0.0 + 0.0 + 0.0 + 0.0	**= 0.0 mg/l**

9.3 MODEL CREATION

From the main screen:

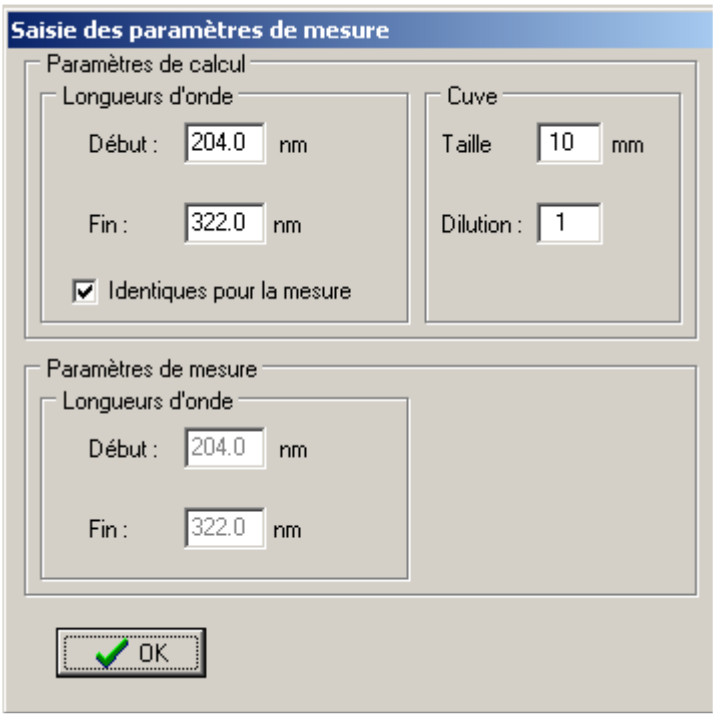


- Select “File” and “Recalibration module”.



At the time of acquisition, the measurement parameters were memorized at the same time as the spectra. The measurement parameters are also related to the type of instrument used.
The operator will be able at the creation time of the model to modify some of these parameters, in particular the wavelength range of measurement, the size of the cuvette or the dilution ratio.

- Click on “Measure parameters”.



9.3.1.1 Calculation parameters

It is the wavelength range on which the calculation of deconvolution will be made. It could never be larger than the measurement wavelength range.
The wavelength range is selected according to the type of instrument used.

9.3.1.2 Measure parameters

It is the measure wavelength range. It could be larger than wavelength range of calculation.
The wavelength range is selected according to the type of instrument used.

9.3.1.3 Scanning speed

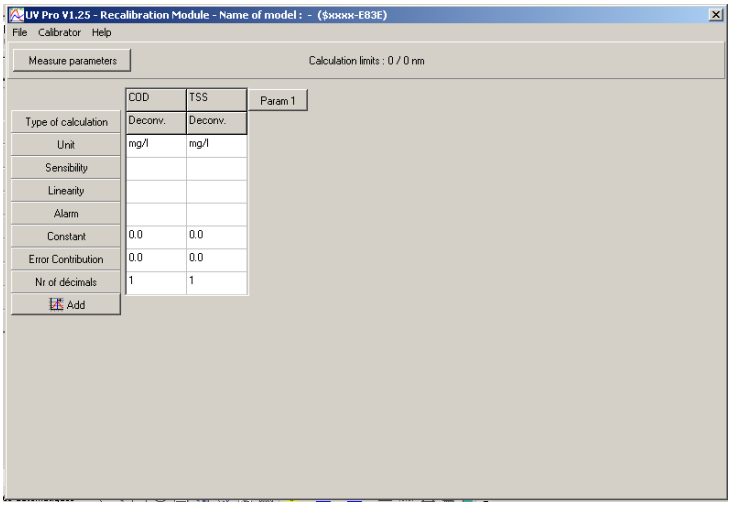
This parameter is not available on analyzer which is working with a diode array system (PASTEL UV, online analyzer).
More the scanning is slow, better will be the spectrum acquisition.

9.3.1.4 Cuvette parameters

Size:
It is the optical path usually used with the selected instrument.

Dilution:
This parameter must always be to 1

9.3.2 Programming of the parameters to be measured



- Click on “Param1” and enter the parameter name; example COD, TSS…
- Validate.
- Enter the other parameters on the same way.

9.3.2.1 Unities

Unit value to use is by default mg/l.
Modify the unity by placing the cursor on it and enter the new one.
- Validate.
- Go to the second parameter with ↓ key

9.3.2.2 Sensibility

It is the sensibility threshold of the measured parameter. The sensibility limit corresponds to the smallest parameter value, which can be measured precisely.

9.3.2.3 Linearity limit

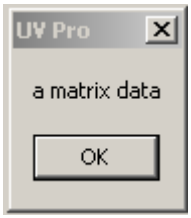
It is the maximum value of the parameter for which the Beer-Lambert law can apply, beyond this value the answer is not linear any more and the value obtained risk to be erroneous.

9.3.2.4 Alarm value

It is the alarm threshold beyond which the result of measurement can pose problems (impacts on the environment, overstepping of a concentration imposed by the legislation...).

The results obtained starting from a model will be thus matched of message in connection with these limits. Example: the result will be display on red background if it is higher than the value of alarm.

NOTE: The values entered for these parameters do not have any influence on the development of the model itself.
On the other hand, if all information did not enter, at the time of the safeguard of the model, the following error message will be displayed.

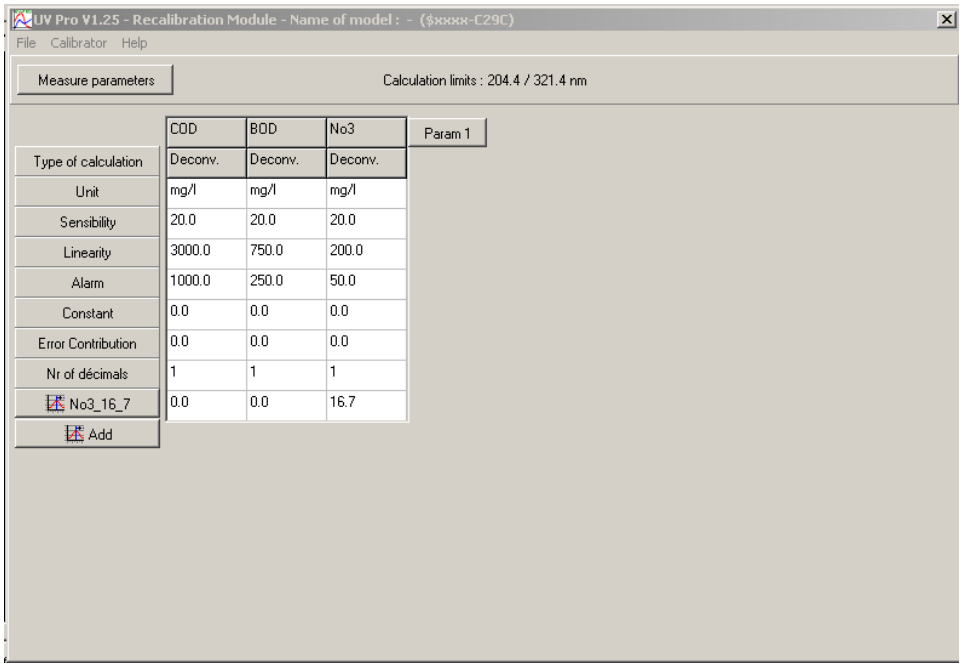


9.4 DETERMINATION OF REFERENCE SPECTRA

The reference spectra could be selected by the operator or calculated using a “calibrator”.

9.4.1 Spectra selected by the operator

If one or more pure compounds are known as being present in the sample to analyze, the operator can then add to the model their spectrum with the corresponding value.
For a pure compound, the value is the concentration of the parameter present in the solution at the time of the spectrum acquisition (Ex: 16,7 mg/l of nitrate).



Ex: Nitrate spectrum.

- Click on “Add”.
- Select, in a directory, the desired spectrum.
- Click on “Open”.

The spectrum is added to the model.
- Enter the concentration value of the spectrum in column of the corresponding parameter (EX: 16.7 mg/g of nitrate).
- Enter 0.0 for the other parameters if the selected spectrum does not intervene in their calculation (Ex: the pure nitrate solution does not contain any organic matter, so there is not COD and BOD).
- enter the value (if it is known) for the other parameters, if the spectrum intervenes in their calculation. If the value for the other parameters is not known, it will obligatorily be necessary to pass by the "calibrator" and in this case to erase the contents of the corresponding boxes.

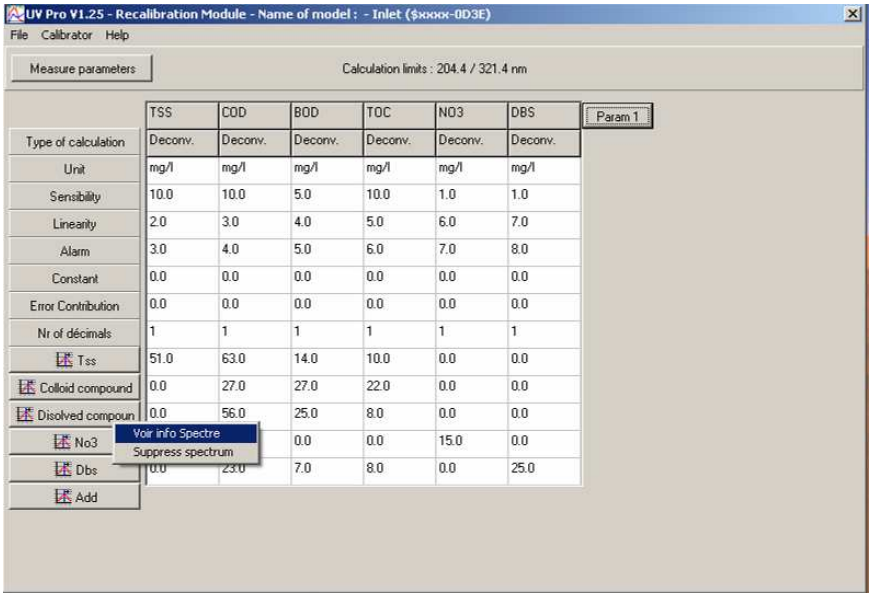
By default, the spectra being used as reference are in the repertory:
CAL_SPECTRE.
It is possible to add to eight reference spectra, this number depends on the material used (maximum 5 for online analyzer and PASTEL UV).

IMPORTANT: If the reference spectra were acquired with a spectrophotometer ANTHELIE or Uvi Light, they have ".SPE" extension. They should be converted with "SCN" format. I.e. saved them with “SCN” extension. See paragraph “Spectra registration”.

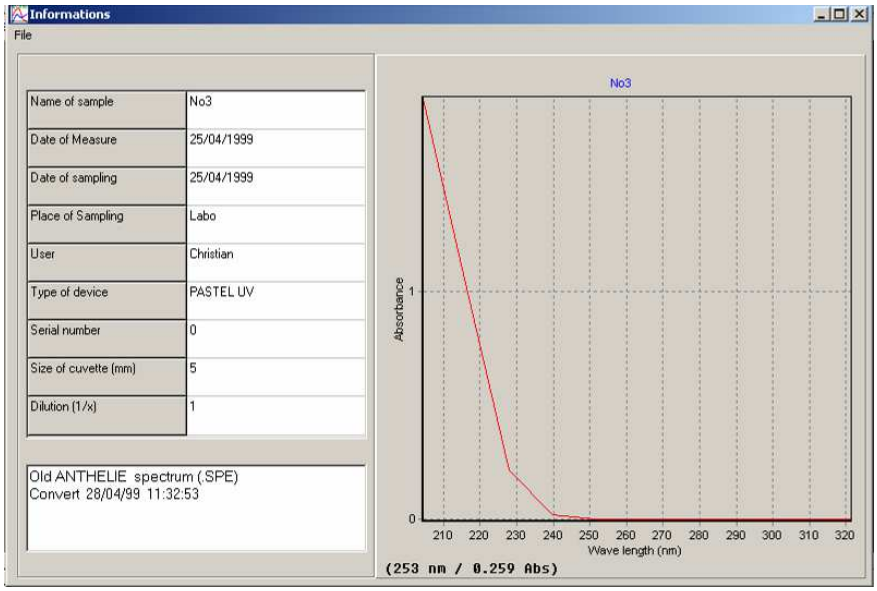
To see information related to a reference spectrum, proceed as follows:

- Place the mouse cursor on one of the reference spectra.

- Click with the mouse right button.



- Select “See spectrum info”
- Validate



The operator has the traceability of the sample with possible remarks, such as the concentration of the solution for example.
In this window, it is possible to modify information of the spectrum and to save these changes while clicking on "File" and "Save".
To come back to the window of model creation, click on "File" and "Exit".

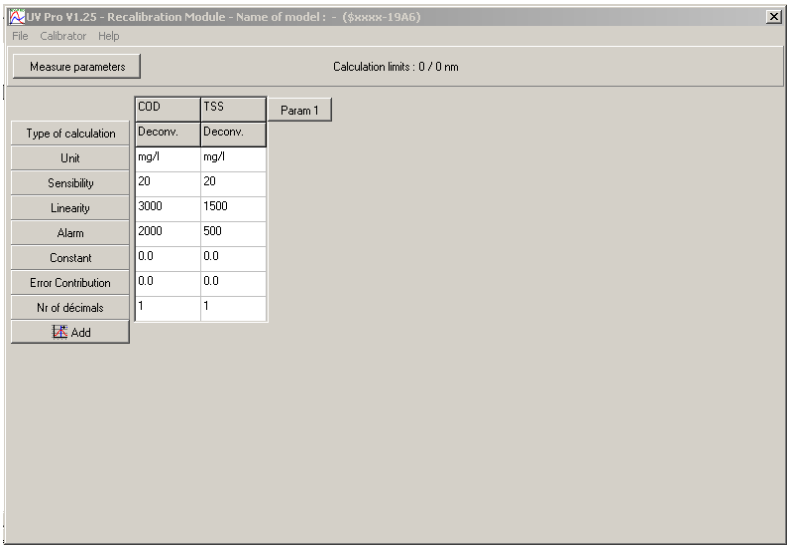
9.4.2 Use of a “calibrator”

9.4.2.1 “Calibrator” definition

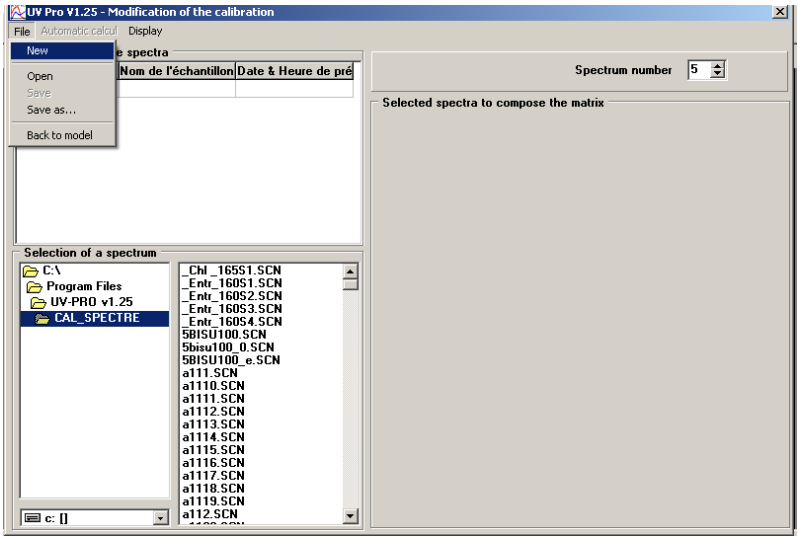
The "calibrator" is a set of spectra representative of all the forms which an effluent can take, associate, for each one of them, to the laboratory values of the parameters that one seeks to measure.
This "calibrator" must at least consist of 10 spectra minimum (20 is an ideal number). More the "calibrator" will include spectra; better will be the resulting model.

VERY IMPORTANT: Not to confuse the spectra of the "calibrator" which are real spectra of the various shapes of the effluent (quantity of 10 minimum, 20 ideal and 50 maximum) and the reference spectra of the model which can be real spectra of pure compounds or mathematical beings created by the deconvolution calculation (quantity from 3 to 8 following the instruments used).

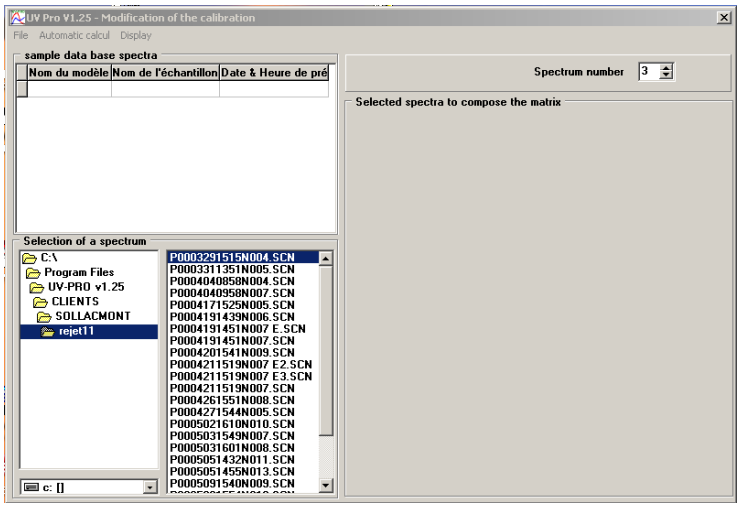
9.4.2.2 "Calibrator" creation



- Select "Calibrateur" after having entered the name of the parameters and the thresholds.

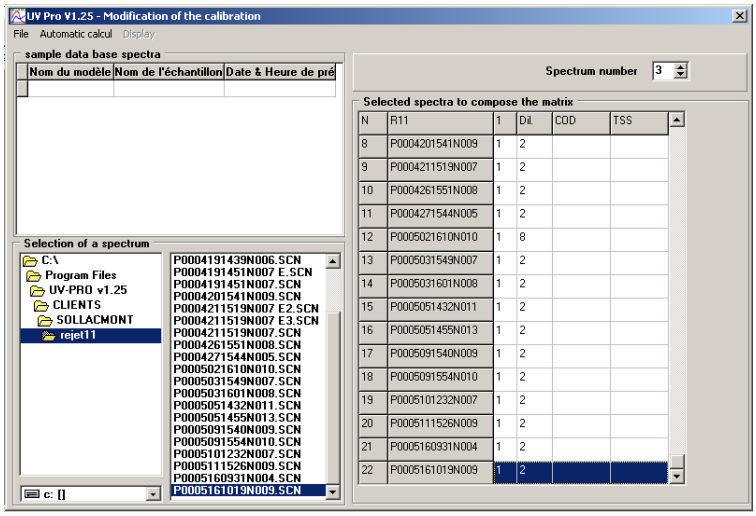


- Put, initially, the number of reference spectra (in top, on the right of the screen) to 3.
- Select "File" and "New".

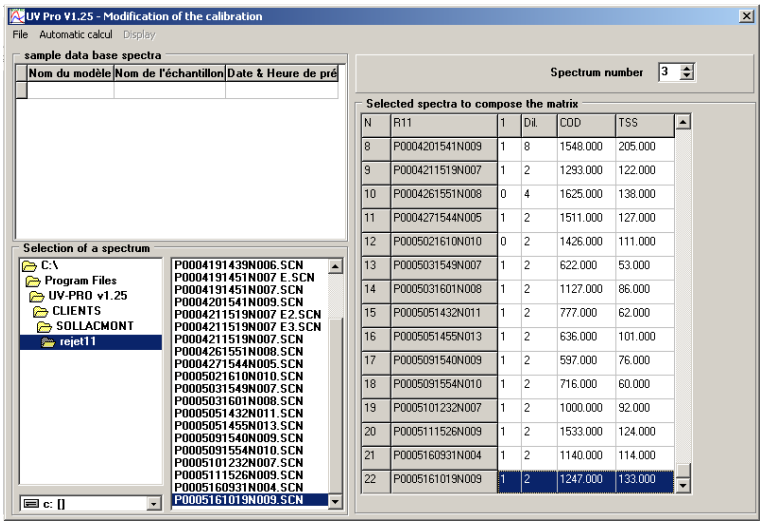


- Go in the repertory containing the spectra of the sample.
- Double click on the spectra which will take part in the “calibrator”.

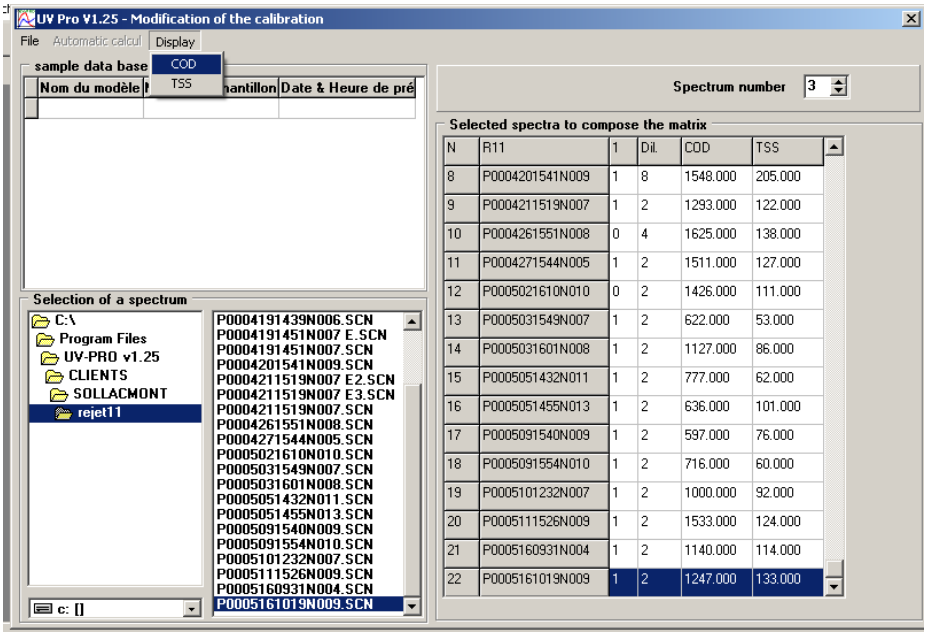
NOTE: During the selection of the spectrum, the dilution ratio used is entered automatically the marked column “Dil”.



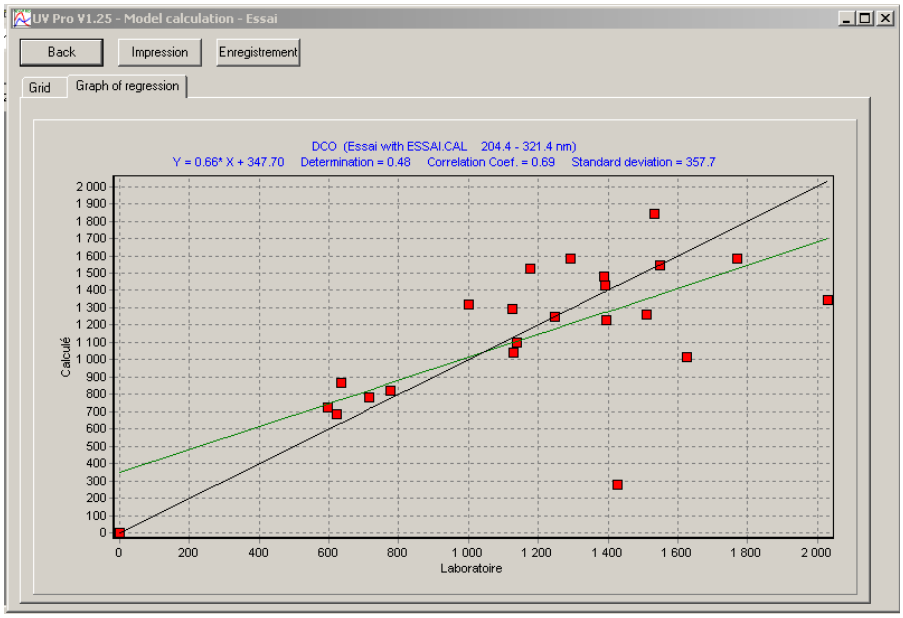
- Enter then the laboratory values associated with each spectrum.



- Select “Automatic calcul” to launch a first model calculation with 3 reference spectra.



- Select “Display”.
- Click on the parameter wished to display the correlation curve between the laboratory values (x-axis) and the computed values (y-axis) by UV-PRO (Ex: DCO)

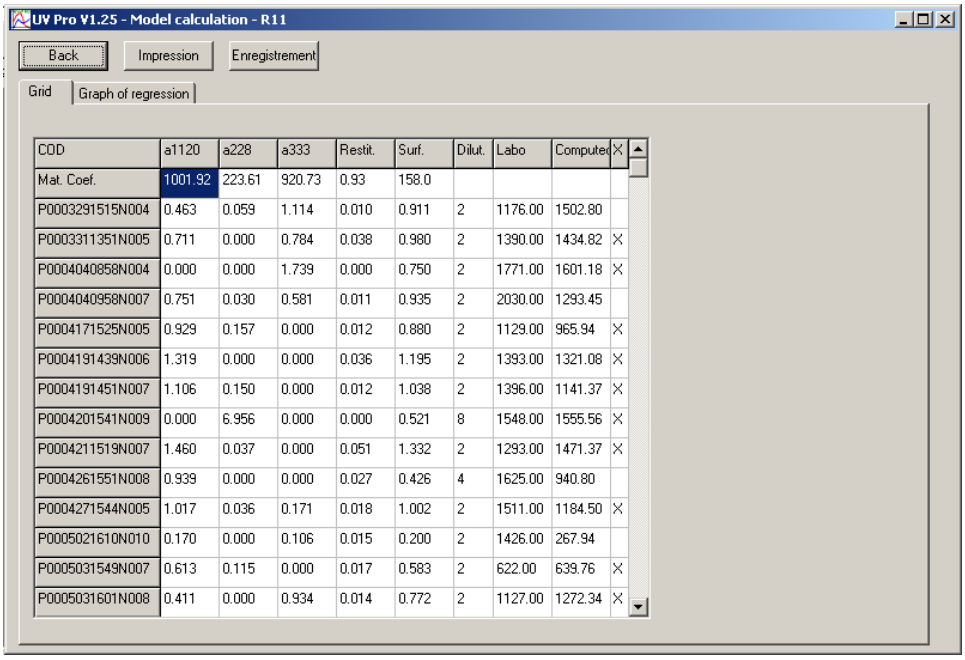


- Note the value of the correlation coefficient (EX: 0,69) and the distribution of the points compared to the curve.

NOTE: More the coefficient of correlation will be close to 1 better will be the correlation between the laboratory values and the computed values by UV-PRO.

- Click on “Impression” to print the table of the values (see following page the explanation of the table)
- Click on “Enregistrement” to record the table of the values to format “.XLS” for exploitation on Excel.

- Click on “Grid” to have details on the points having been used for the construction of the calibration curve.



COD	a1120	a228	a333	Restit.	Surf.	Dilut.	Labo	Computed	X
Mat. Coef.	1001.92	223.61	920.73	0.93	158.0				
P0003291515N004	0.463	0.059	1.114	0.010	0.911	2	1176.00	1502.80	
P0003311351N005	0.711	0.000	0.784	0.038	0.980	2	1390.00	1434.82	X
P0004040858N004	0.000	0.000	1.739	0.000	0.750	2	1771.00	1601.18	X
P0004040958N007	0.751	0.030	0.581	0.011	0.935	2	2030.00	1293.45	
P0004171525N005	0.929	0.157	0.000	0.012	0.880	2	1129.00	965.94	X
P0004191439N006	1.319	0.000	0.000	0.036	1.195	2	1393.00	1321.08	X
P0004191451N007	1.106	0.150	0.000	0.012	1.038	2	1396.00	1141.37	X
P0004201541N009	0.000	6.956	0.000	0.000	0.521	8	1548.00	1555.56	X
P0004211519N007	1.460	0.037	0.000	0.051	1.332	2	1293.00	1471.37	X
P0004261551N008	0.939	0.000	0.000	0.027	0.426	4	1625.00	940.80	
P0004271544N005	1.017	0.036	0.171	0.018	1.002	2	1511.00	1184.50	X
P0005021610N010	0.170	0.000	0.106	0.015	0.200	2	1426.00	267.94	
P0005031549N007	0.613	0.115	0.000	0.017	0.583	2	622.00	639.76	X
P0005031601N008	0.411	0.000	0.934	0.014	0.772	2	1127.00	1272.34	X

**** LINES***

- **line 1**: name of parameter (COD), name of the spectra of reference (a1120, a228…)
- **line 2**: the value of each spectrum for the calculated parameter (1001,9 mg/L of COD for the spectrum a1120, 223,61 mg/L of COD for the spectrum a228…)
- **line 3**: starting from line 3, the operator finds information for each spectrum having taken part in the development of the calibration curve.

**** COLUMNS***

- **column 1**: name of the spectra
- **column 2**: Value brought, for all the spectra of the “calibrator” by the first spectrum of reference (a1120).
- **column 3**: Value brought, for all the spectra of the “calibrator” by the second spectrum of reference (a228).
- **column 4**: Value brought, for all the spectra of the “calibrator” by the third spectrum of reference (a333).
- **column 5**: Variation of restitution between the theoretical spectrum and the measured spectrum of the sample
- **column 6**: Existing surface between the theoretical spectrum and the measured spectrum of the sample
- **column 7**: Dilution factor used during the measurement of the sample.
- **column 10**: Laboratory value of parameter (COD) for each sample.
- **column 11**: Computed value of parameter (COD) for each sample.
- **column 12**: Participation (X) or not () of the laboratory value of the parameter in the “calibrator”.

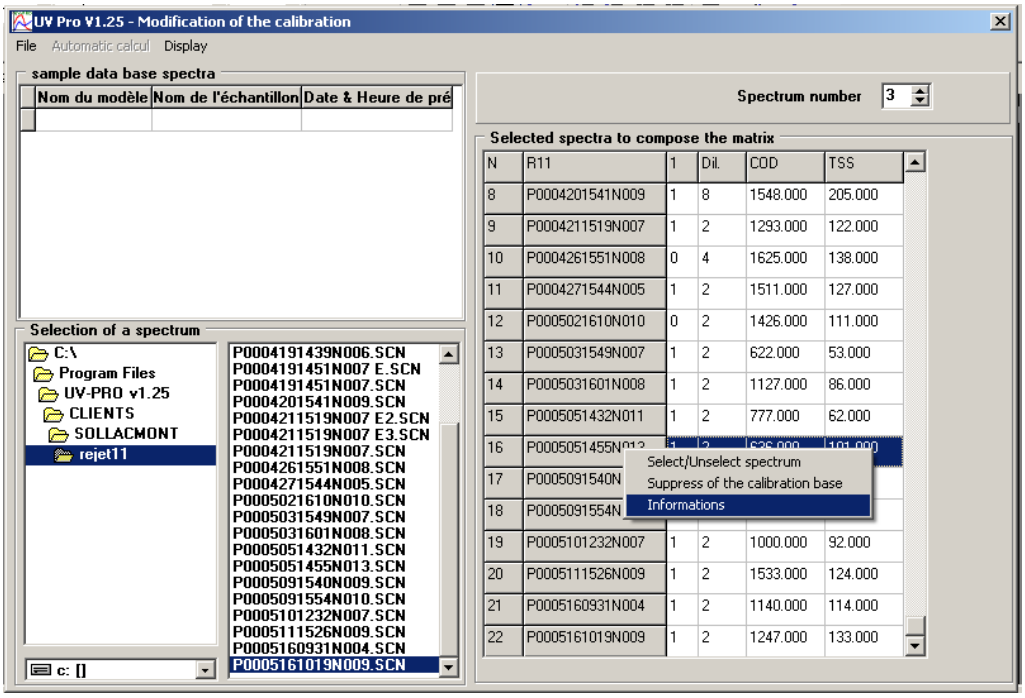
9.4.2.3 How to increase the value of the correlation coefficient

Each operation made on the “calibrator”, (removed spectrum, contribution of the removed spectrum), or on the model (increase or reduction in the number of reference spectra, change of the value of reference spectra) will be followed by the total

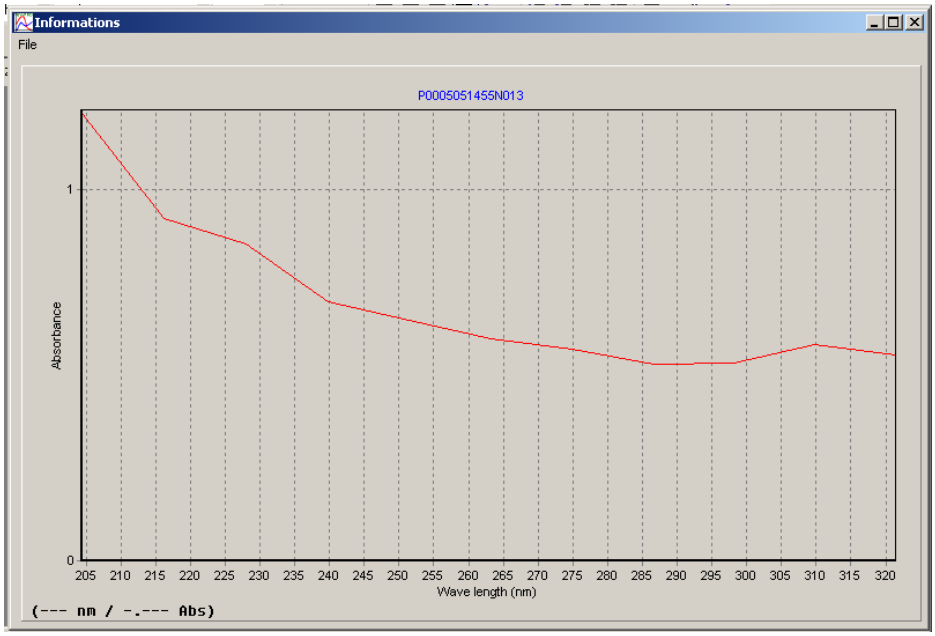
obliteration of the reference spectra (out those added by the operator) and an automatic recalculation of the model.

a) Checking of the spectra shape

To check the shape of the spectra, proceed as follows:

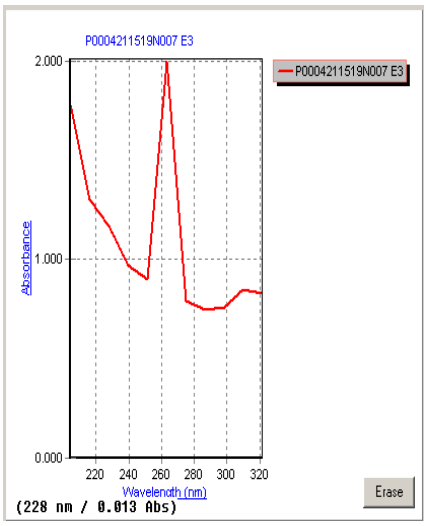


- Place the mouse cursor on the spectrum name.
- Click on the mouse right button.
- Select “Information”
- Validate.



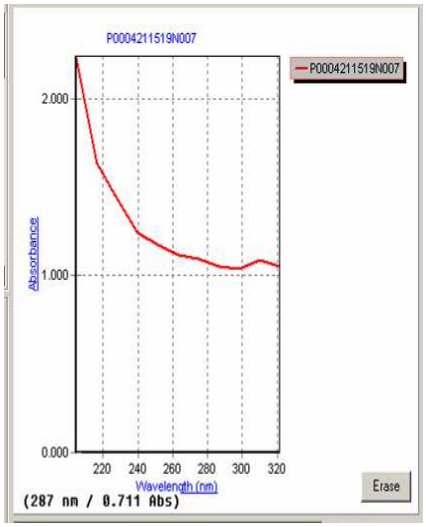
- Verify each spectrum in same way.

The spectra must:



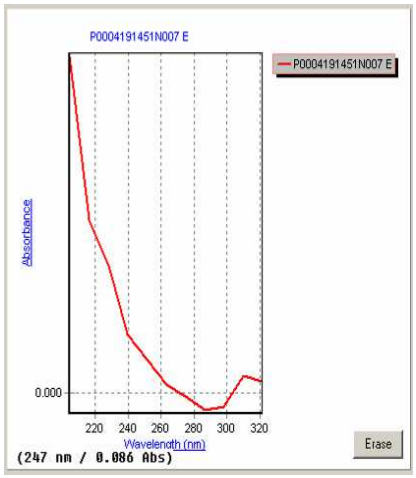
Spectrum with an irregular form compared to the whole of the spectra

- have a regular form (except if the anomaly reveals the presence of a particular compound)



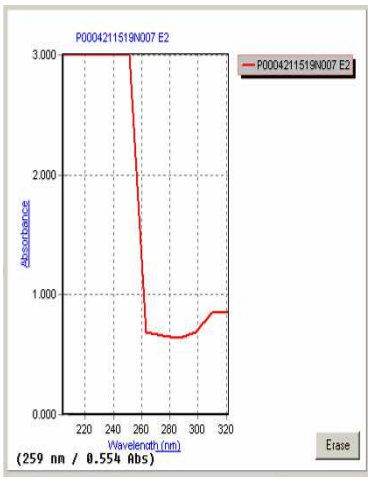
Spectrum which the absorbance of the first wavelength is over 2.0A

- be lower than 2,0 ABS. However a value overrun can be tolerated for the first three wavelengths (204, 216, 228 Nm) on a PASTEL UV.



Spectrum with a negative part.

- have no negative part.



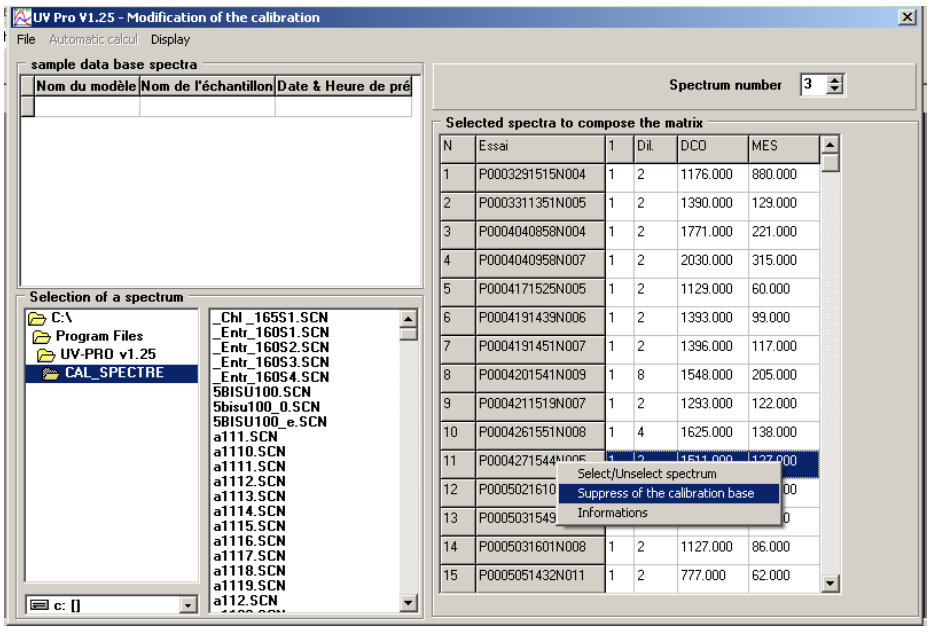
Saturated spectrum

- have no saturated part.

If that were the case, it is necessary to remake the acquisition of the spectrum while checking:
- the cleanliness of the cuvette.
- the presence of big particles (diameter > 3 mm) or bubbles which would obstruct the passage of the beam inside the cuvette.
- that the dilution applied to the sample is sufficient.

If not, remove the spectrum of the “calibrator”

To remove a spectrum of the “calibrator”, proceed as follows:

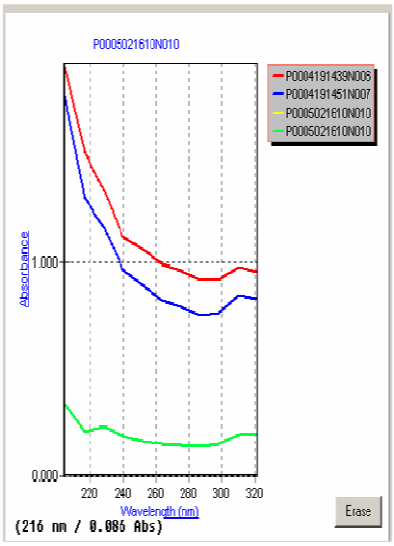


- Place the mouse cursor on the spectrum name.
- Click on the mouse right button.
- Select “Suppress of the calibration base”
- Validate.

b) To remove the aberrant points

It is possible that for values laboratory close relations, there are one or two very different spectra which will give very different computed values.

Example



Spectra	Laboratory values	Computed values
P0004191439N006	1393 mg/l	1426 mg/l
P0004191451N007	1396 mg/l	1228 mg/l
P0005021610N010	1426 mg/l	280 mg/l

In this example, it appears that sample P0005021620N010 has either an erroneous laboratory value, or a badly measured spectrum.

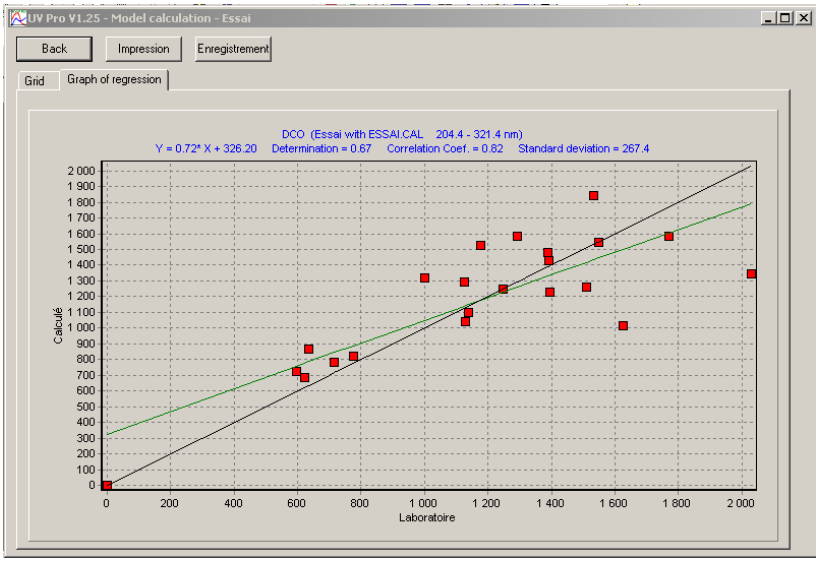
It is possible to eliminate its contribution (numerical value) from the “calibrator” while preserving the shape of the spectrum.

During the establishment of a “calibrator”, it is possible to eliminate 10% from the points.

Once the contribution of the spectrum eliminated in the “calibrator”, display again the calibration curve for the considered parameter and look at if the coefficient of correlation increased.

Check that it is the same for the other parameters.

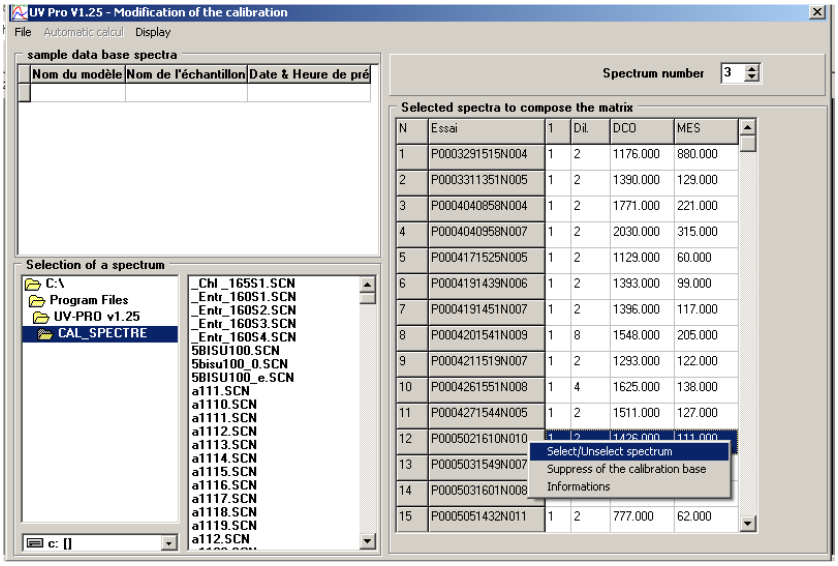
Example:



The correlation factor was increased from 0.69 up to 0.82

NOTE: The step is the same one if the operator has a doubt about the dilution ratio

To remove the contribution of a sample but not its spectrum of the “calibrator”, proceed as follows:



- place the cursor of the mouse on the name of the spectrum.
- click with the right button of the mouse
- choose “Select/Unselect spectrum” or double to click on the box which follows the name of the spectrum.

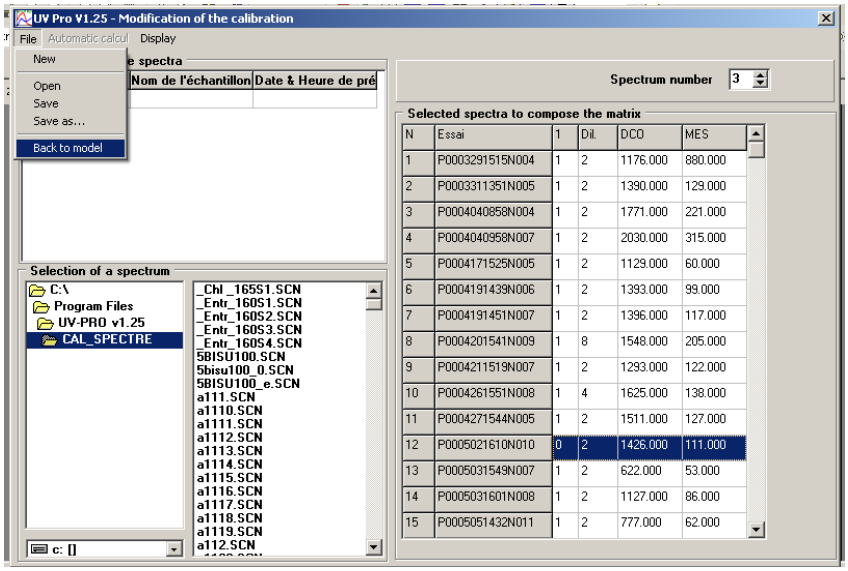
The value passes from 1 (the contribution is taken into account) to 0 (the contribution of the spectrum is not taken into account, but only the shape of the spectrum).

- validate

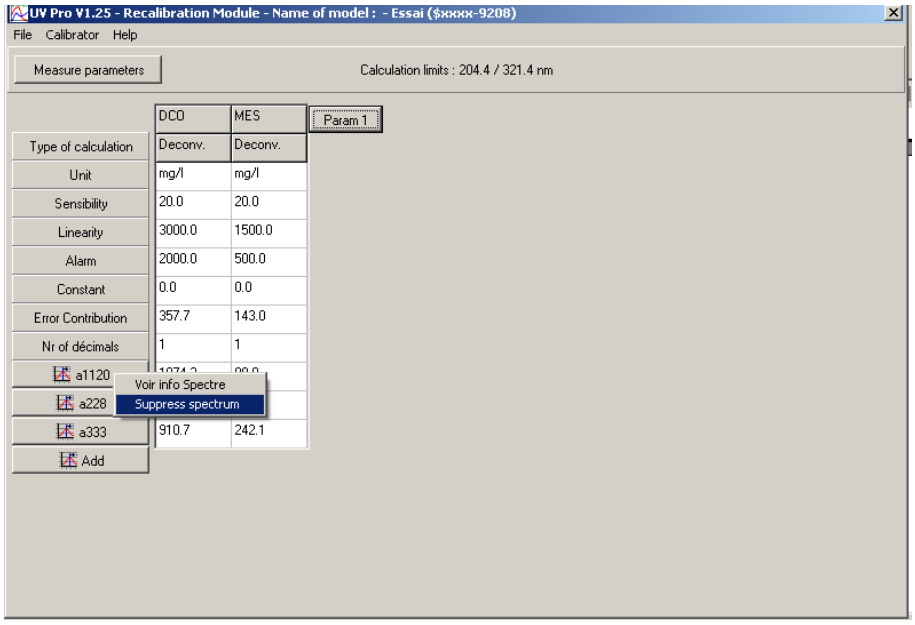
c) Increase the number of reference spectra

To increase the coefficient of correlation, it is possible to increase the number of spectra (according to the type of apparatus) taking part in the model

To increase the number of spectrum of the model, proceed as follows:

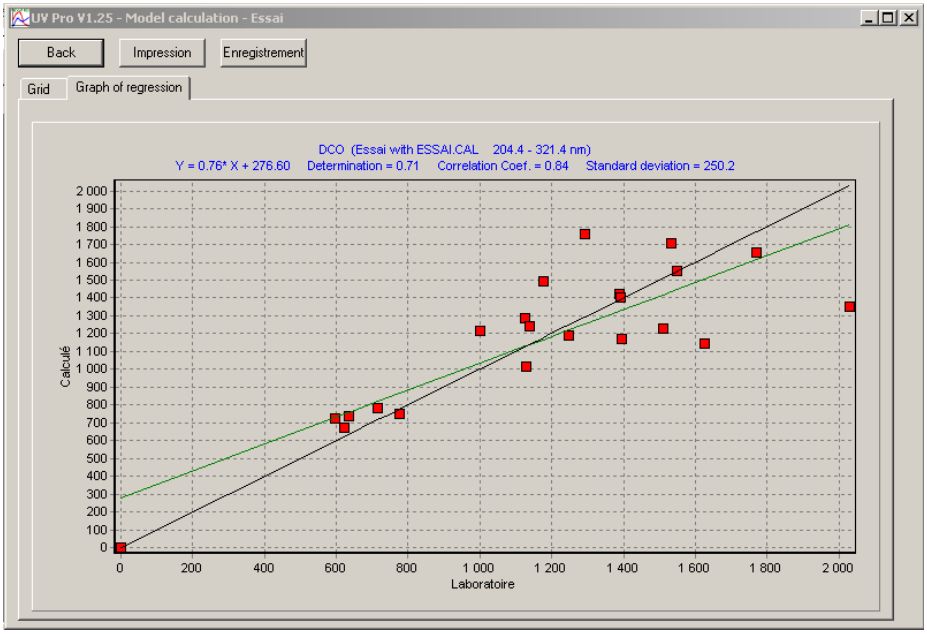


- Select “File” and “Back to model”



- put the cursor on the spectrum name.
- click on the right button of the mouse.
- choose “Suppress spectrum”.
- validate.
- proceed in the same way for the other spectra.
- come back to the “calibrator”
- increase by a unit, the number of spectra (in top on the right of the screen) taking part in the model.
- start again calculation.
- check if the coefficient of correlation increased.
- start again the operation by adding a spectrum again.
- make the operation until the maximum of spectra of reference allowed for a given apparatus.

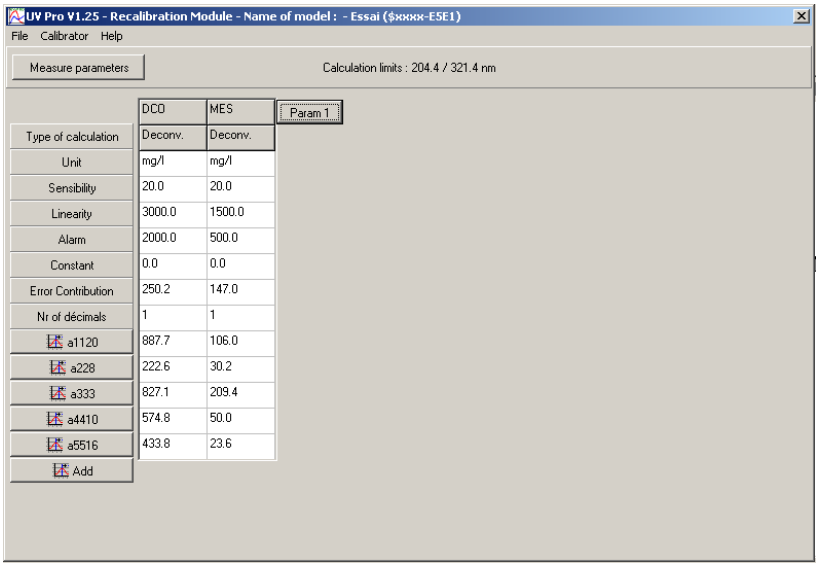
Ex: 5 spectra for a PASTEL UV



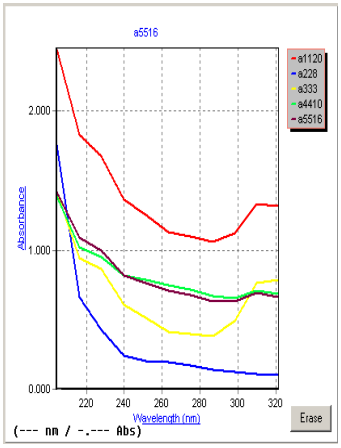
In the example, the fact of passing from 3 spectra to 5 spectra made pass the coefficient of correlation from 0,82 to 0,84.

NOTE: When one increases the number of reference spectra, it should be made sure that the calculation of the model did not create identical spectra with very different values for certain parameters. This could involve instability of the model, then a fluctuation in the results of measurement.
It is sometimes preferable to calculate a model with a number of spectra more reduced, even if it means to lose a little on the value of correlation coefficient, but to have in this case a more stable model.

To compare the spectra of the model, to proceed as follows:



- note the name of the reference spectra. They are form axxxx. Except the spectra chosen by the operator. (In the example: a1120, a228, a333, a4410, a5516).
- note the value of each spectrum for the calculated parameters.
- return to the menu principal.
- select “Spectrum module”
- Enter in “CAL_SPECTRE” directory.
- select the first spectrum
- validate and so on.

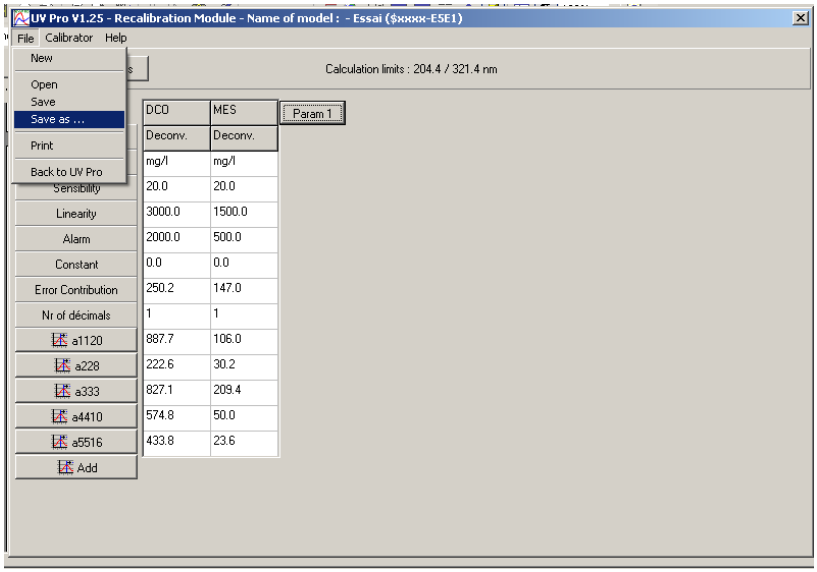


In the example, it is possible to see that two spectra are almost identical (a4410 and a5516) whereas they have appreciably different values.
In fact model recomputed with 4 reference spectra, makes pass the coefficient of correlation from 0,84 to 0,83.
In this case, it is thus preferable to be limited to a model with four reference spectra instead of five: the model will be more stable.

9.5 RECORDING

At each step, do not forget to save the model and the “calibrator”.

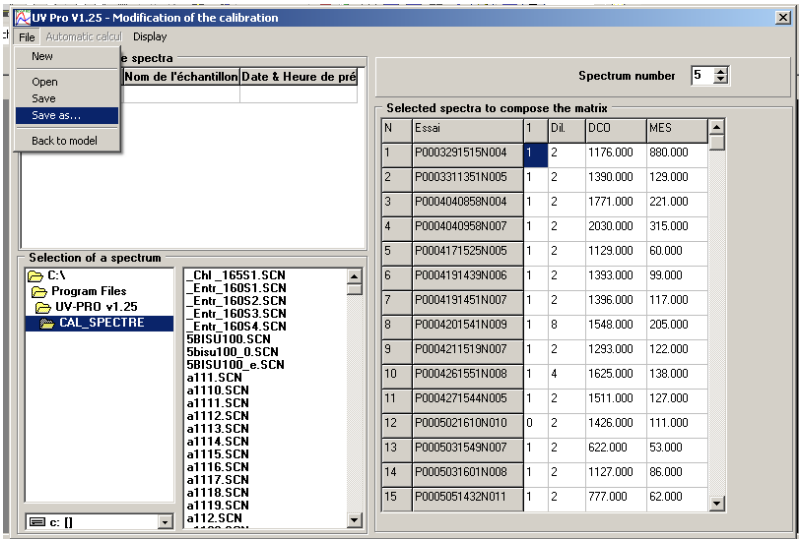
9.5.1 Model backup



- select “File” and “Save as …”.
- choose the directory.
- give a name to the model (the extension of the file will be “.MOD”).
- validate.

NOTE: Choose a short name of 4 characters or make so that the first 4 characters of the model name are significant because UV-PRO software automatically limits to 4 characters the names of the models when it displays them on PASTEL UV.

9.5.2 “Calibrator” backup



- select “File” and “Save as …”.
- choose the directory.
- give a name to the “calibrator” (the extension of the file will be “.CAL”).
- validate.

9.6 MODEL CONVERSION

9.6.1 Conversion purpose

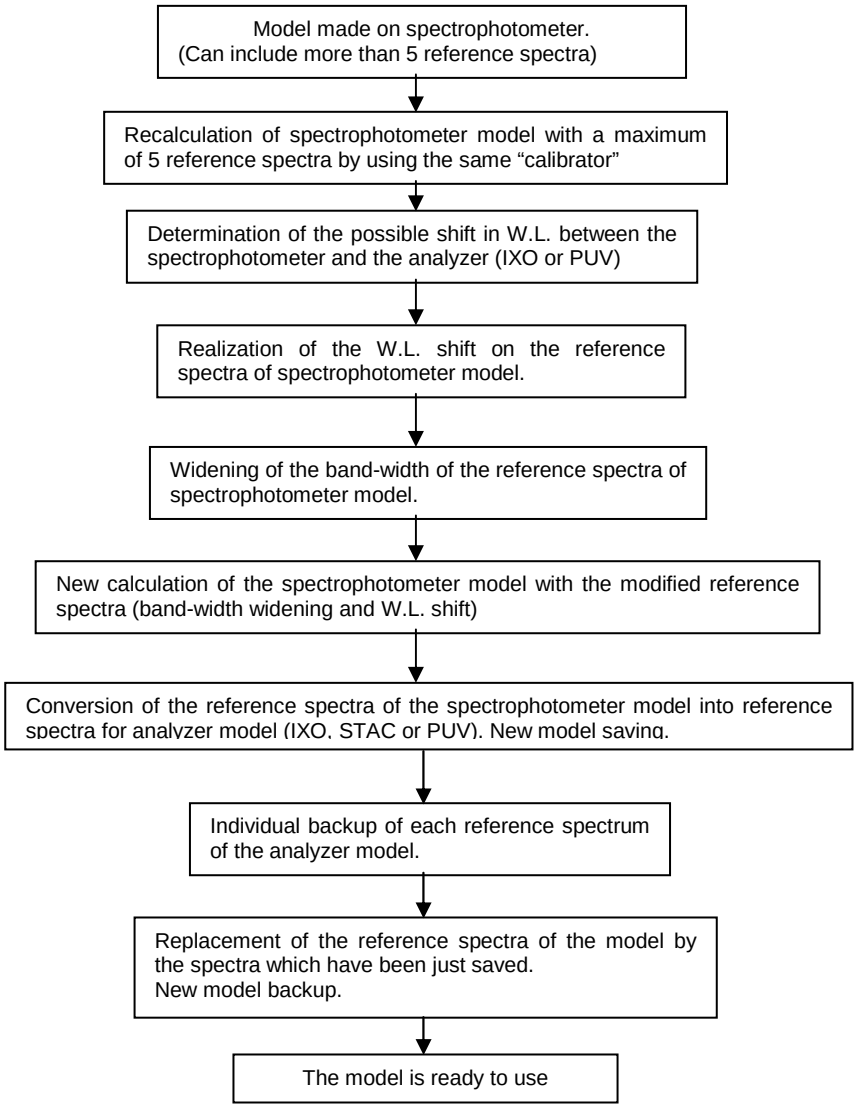
As the reference methods are laboratory methods, it is easier to use a spectrophotometer (Uvi Light, ANTHELIE or UVIKON) to build a model which allows measuring the concentration of various parameters on the on-line analyzer or portable analyzer.

As those spectrophotometers have better resolution (1 nm) and a narrower band width (5 or 2 nanometer) than on-line or portable analyzer (one measurement every 12 nanometers), it is necessary to convert the model before to transfer it.

To take account of these parameters, the user will be brought consequently to modify the reference spectra of the model (Ex: a113, a2140…) before converting them for the use on an online analyzer or a PASTEL UV.

This will be explained briefly in the flow chart below and in detail in the paragraph "PROCEDURE".

9.6.2 Flow chart



9.6.3 Procedure

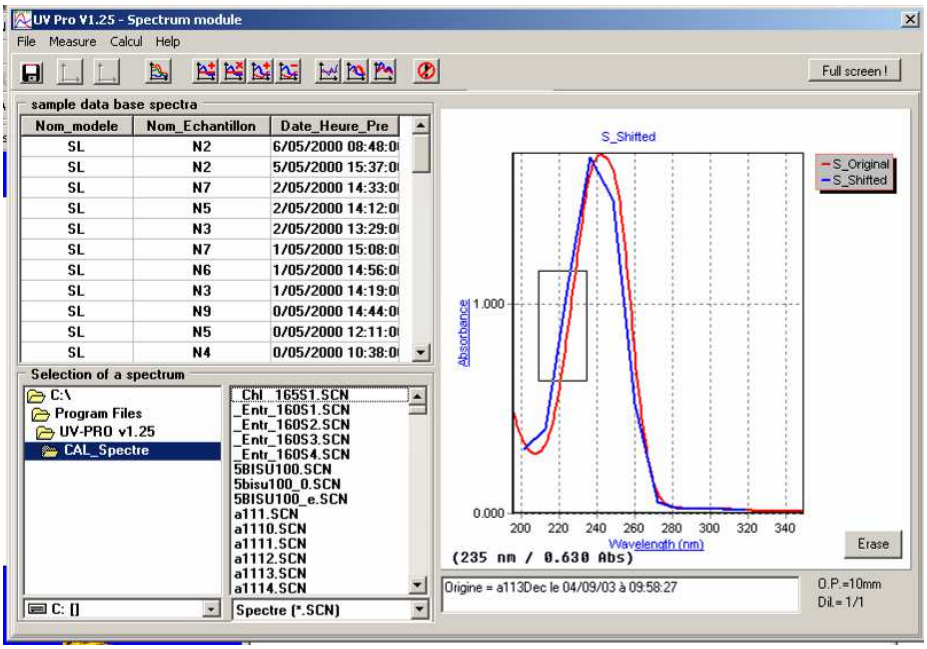
9.6.3.1 *Elimination of reference spectra*

A model which was made with a spectrophotometer ANTHELIE or Uvi Light can included more reference spectra (maximum 8) than a model which was made with an online analyzer or a PASTEL UV (maximum 5).
To eliminate the reference spectra in excess, the simplest way is to recalculate a model which would include only 5 reference spectra maximum.

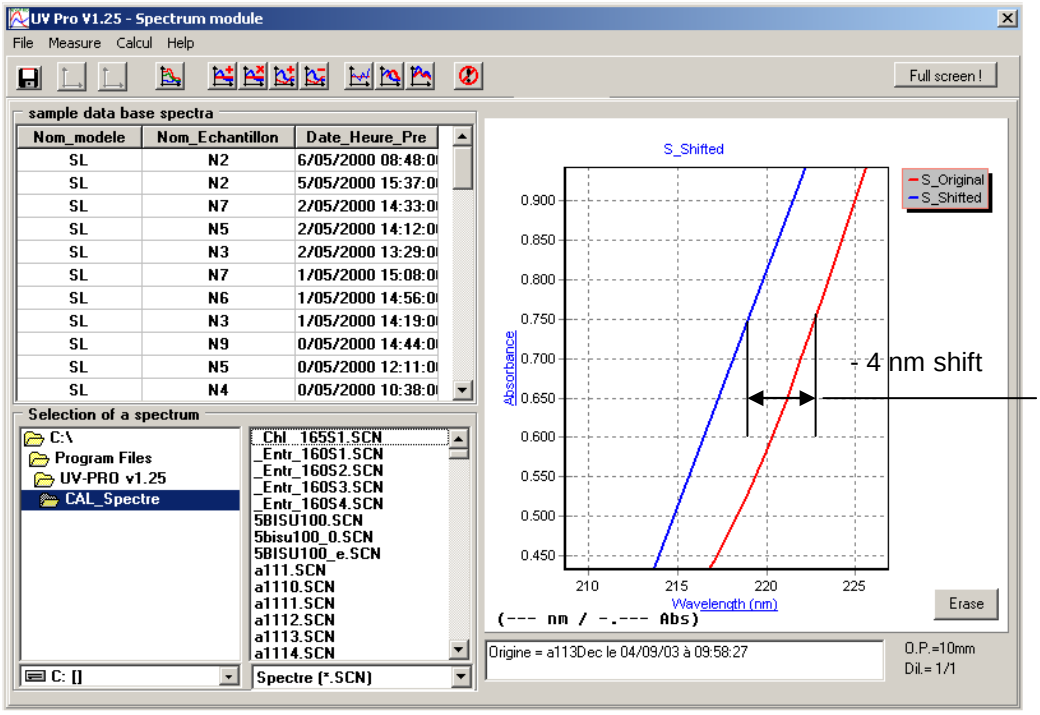
- Select “Config”, “Connection”,
- Select the spectrophotometer with which the model was made.
- Enter in “Recalibration module”.
- Open the model.
- Erase the reference spectra of the model.
- Go back in the “calibrator” who was used for the old model,
- Enter the number of reference spectra which will be calculated (maximum 5).
- Start again calculation,
- Save this new model (EX: MOD01).
- Note the names of the spectra of reference participating in model (EX: a113, a224, a335,…) and their coefficient of participation.

9.6.3.2 *Measure of wavelength shift*

As the resolution and the precision between the two monochromators are not identical, it can appear a shift in wavelength of some nanometers. To evaluate this possible shift, proceed in the following way:
- Make a solution of chlorine (concentration between 0.7 and 1 gr./L) or anionic detergent (concentration between 25 and 50 Mg/L).
- Realize the acquisition of the spectrum of this solution on the spectrophotometer and the analyzer by using UV-PRO software.
- In the module spectrum, display the spectrum which comes from the spectrophotometer whose extension is “.spe”.
- Re-record this spectrum with extension “.SCN”.
- Superimpose the 2 spectra.

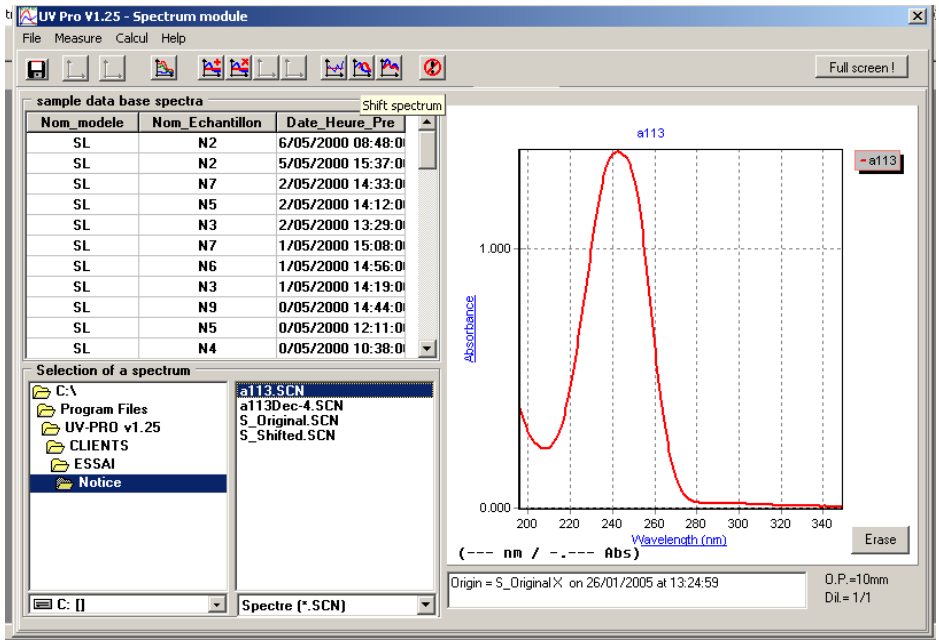


- Realize an enlarging of the sides of the peaks.



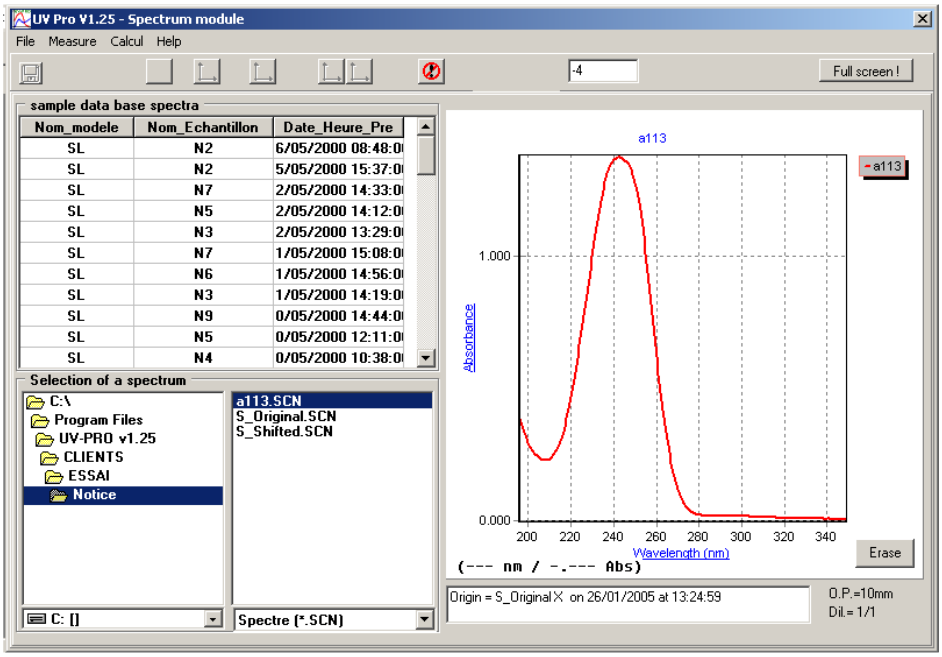
- Measure the wavelength shift.

9.6.3.3 How to shift a spectrum in wavelength.

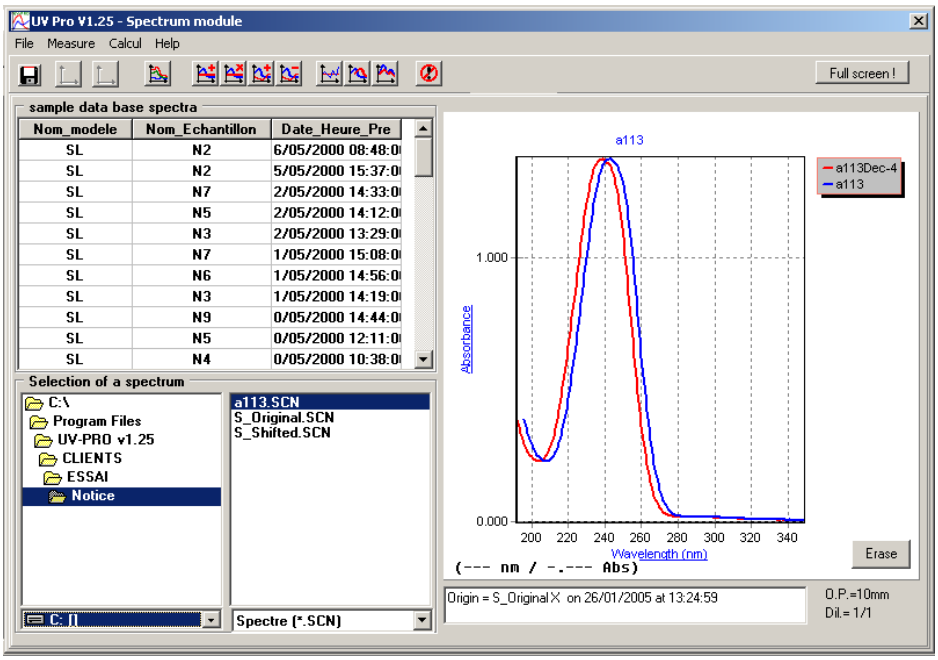


- Load one of the reference spectra which has been shifted.

- Click on the button:



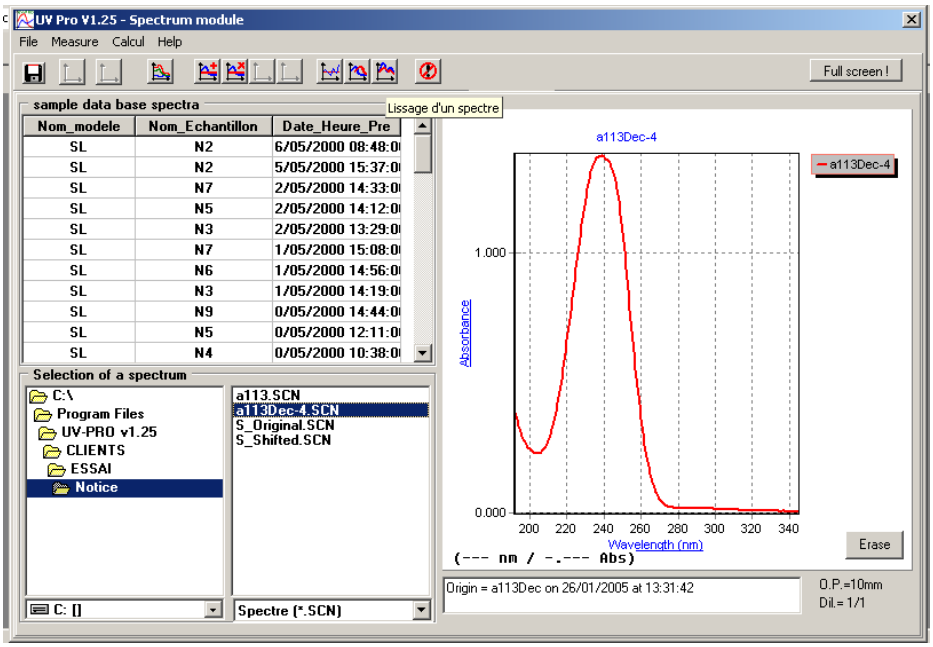
- Enter the value of the shift (here – 4 nm).
- Validate.



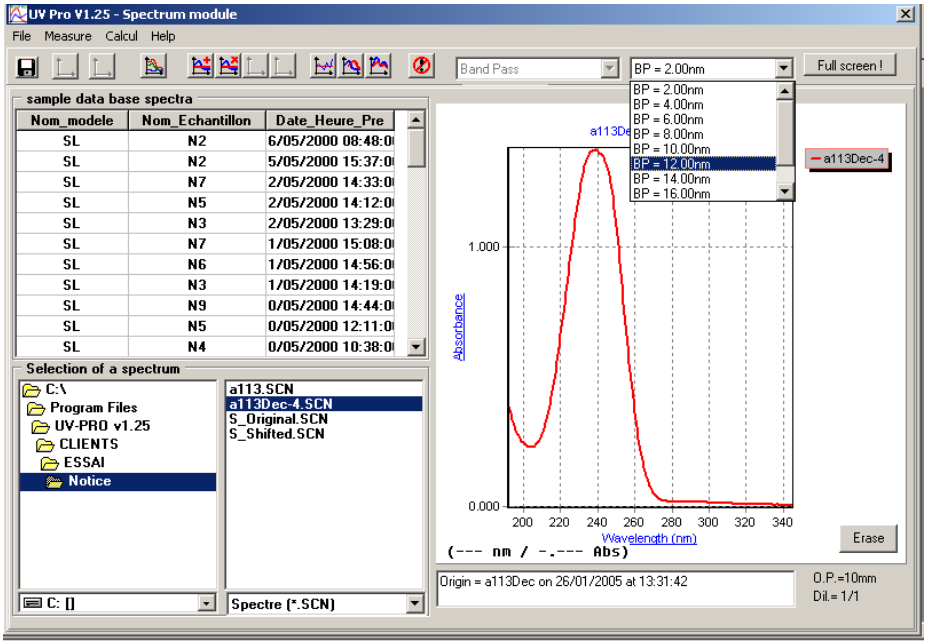
- Save the curve.
- Realize this operation on all the reference spectra of the model.

9.6.3.4 How to widen the band-width

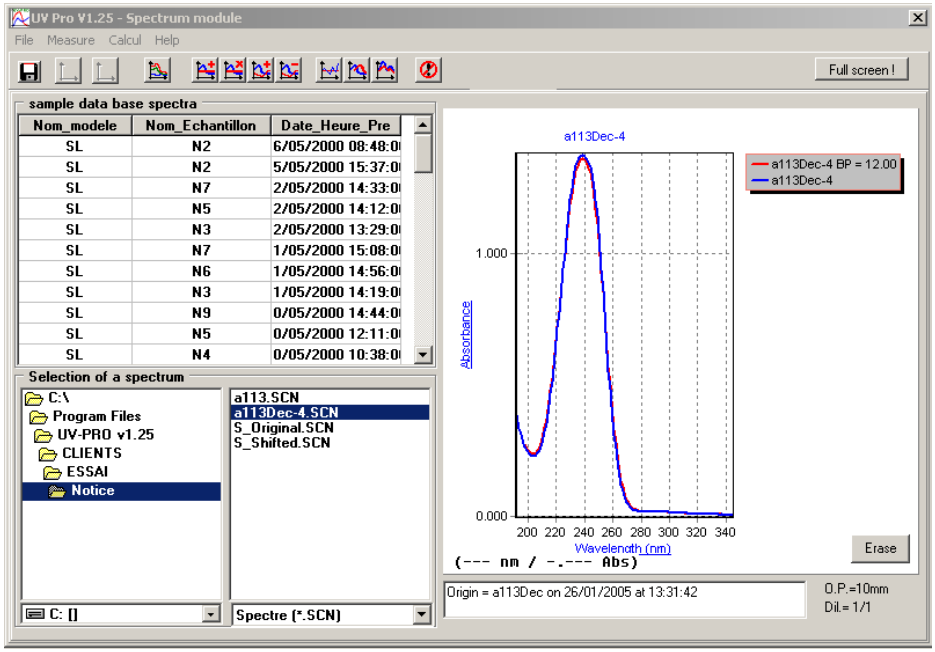
As the monochromators of the instruments have different band-widths (2 or 5 nm for the ANTHELIE or Uvi Light, 12 nm for online analyzer and PASTEL UV), it is necessary to recalculate the reference spectra of the model by taking account of this difference.
This operation will be made on the reference spectra of the model which were already shifted.
- Load one spectrum of reference already shifted (EX: A113Dec-4).



- Click on button:



- Select “Band Pass” and “BP = 12,00 nm”.
- Validate



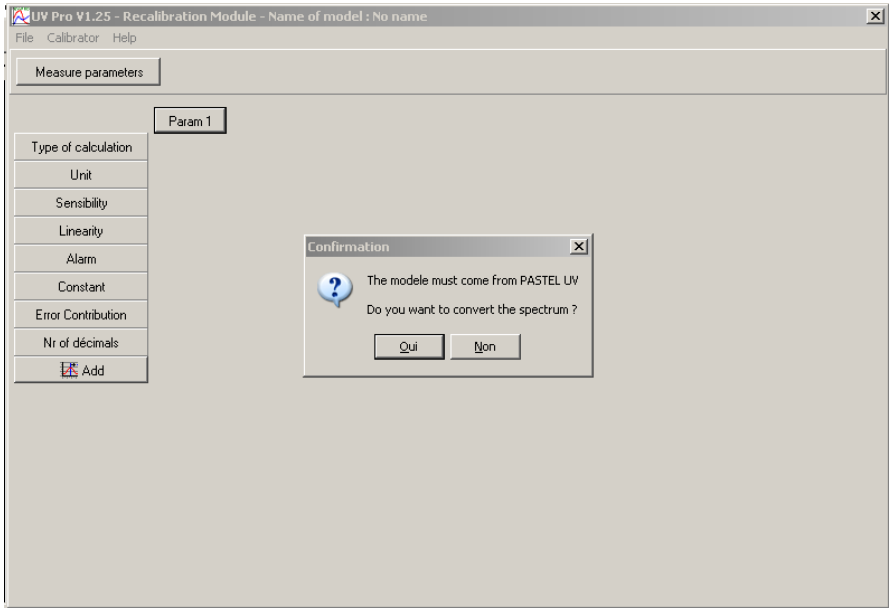
- Save the curve.
- Realize this operation on all the reference spectra, already shifted, of the model.

9.6.3.5 Constitution of the new model

- Select “Config”, “Connection”.
- Select the spectrophotometer.
- Enter in “Recalibration module”.
- Open the model (EX: MOD01).
- Note the value of each reference spectrum of the model.
- Erase the reference spectra of the model.
- Enter the new wavelength range which takes account of the shift in “Measure parameters”.
- Load the new reference spectra (spectra on which the various operations were made).
- Enter the value of the old spectra.
- Save the new model (EX: MOD02).

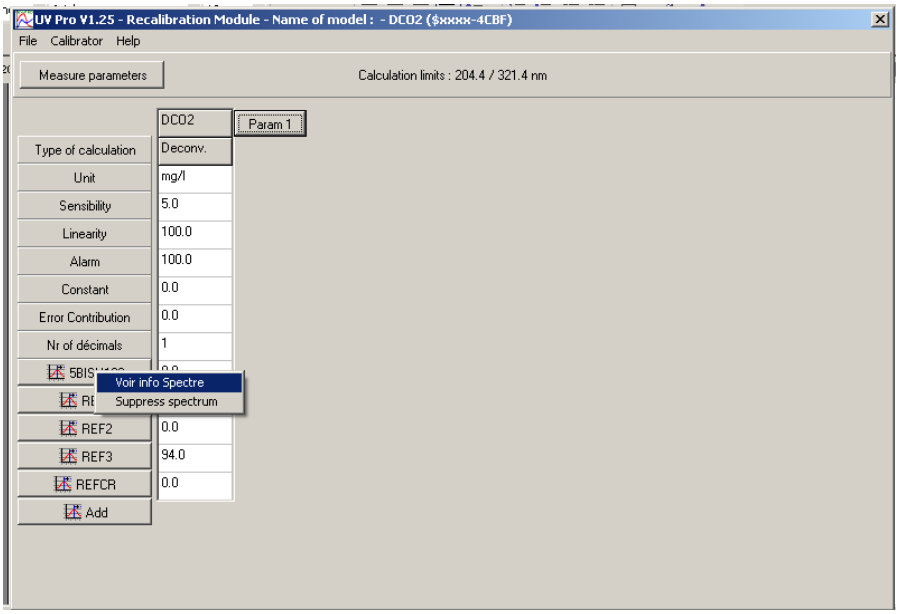
- Enter in “Config”, “Connection”,
- Choose “IXO-510” or “PASTEL UV”.
- Enter in “Recalibration module”.
- Open the modified model (EX: MOD02).

It displays:



- Answer “YES”.
- Save the new model (EX: MODIXO01).

In order to avoid interferences between the various created reference spectra (original spectra, shifted spectra, shifted spectra with BP=12 Nm…) during the concentration calculation, save each reference spectrum of new model (EX: MODIXO01) under new names.



- Clicks right on the name of the reference spectrum.
- Choose “See information Spectrum”.
- Select “File”, “Save”.
- Give a new name to the spectrum.
- Realize the same operation for each reference spectrum of IXO model
- Erase the reference spectra of the model.
- To enter new renamed reference spectra.
- Introduce the values of each one of them.
- Save this new model (EX: MODIXO02).

It is this model which will be downloaded on IXO or PASTEL UV analyzer.

- Download the model.

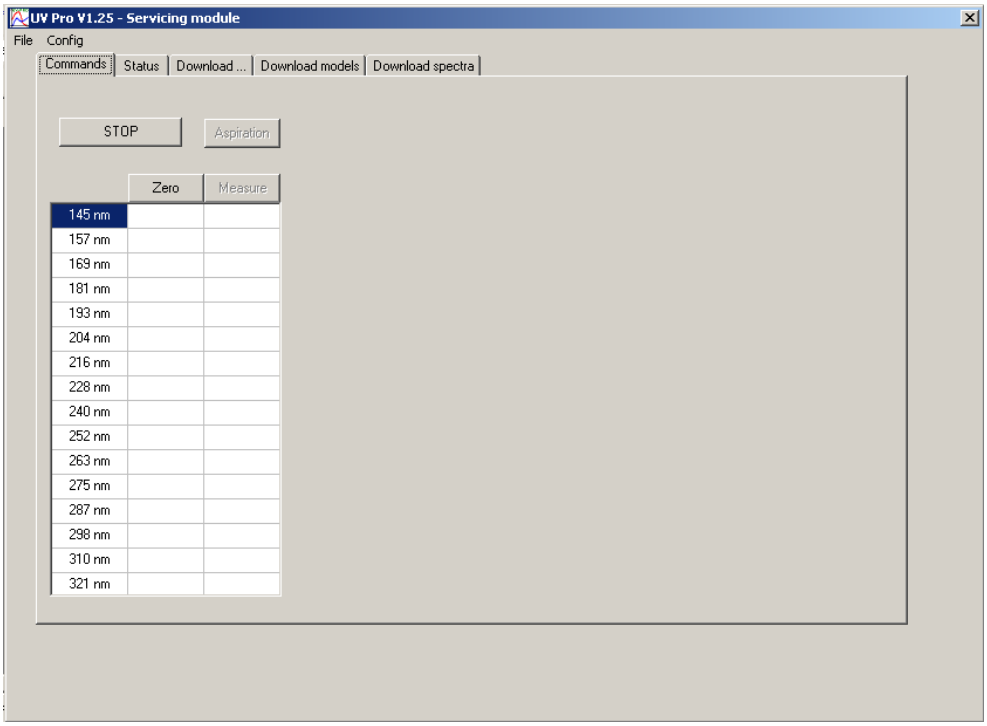
10 SERVICING MODULE

This module is only available with PASTEL UV and online analyzer. It consists of 5 indexes.

- Commands: allows remote control of PASTEL UV and online analyzer.
- Status: displays information on instrument traceability.
- Download: not available
- Download models: allows to download models from PC to analyzer or vice versa (bidirectional)
- Download spectra: allows retrieval of stored spectra from the analyzer to PC (one way).

***NOTE*: In spite of certain similarities with the function "Recovery module", the "Download spectra" function does not retrieve continuously and automatically the measured spectra.**

- Select "File" and "Servicing module". It displays:



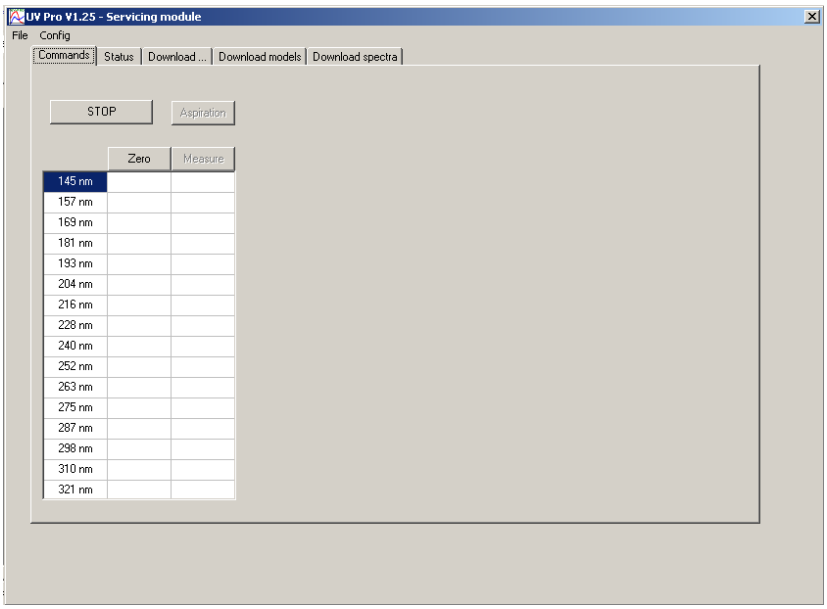
10.1 "COMMAND" INDEX

This menu allows to command, from the PC, various operations (Blank measurement, sample measurement…).

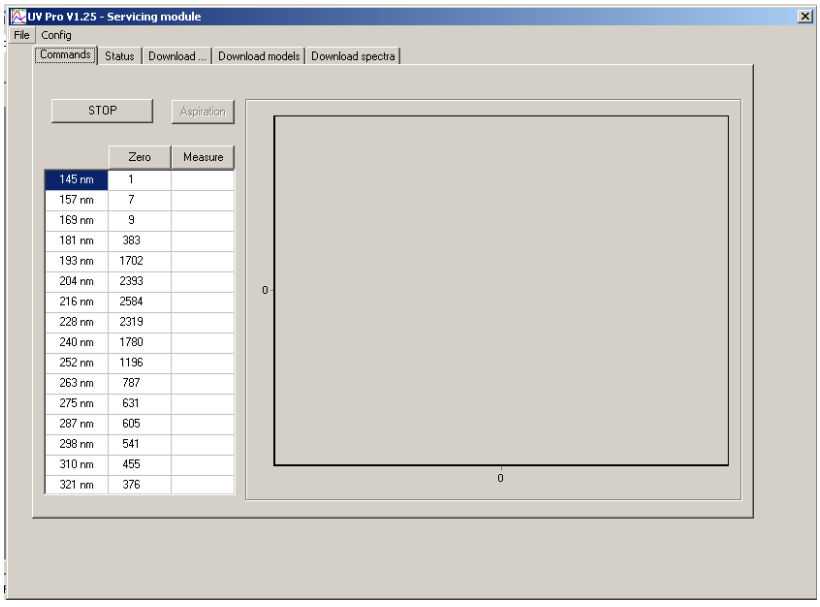
10.1.1 Pastel UV

Its essential use is to give the information about deuterium lamp energy to detect the ageing of the deuterium lamp.

When the PASTEL UV is connected, it displays:



To test deuterium lamp energy:
- **Remove the cuvette**,
- Click on “zero” button.
The unit executes the measurement and displays



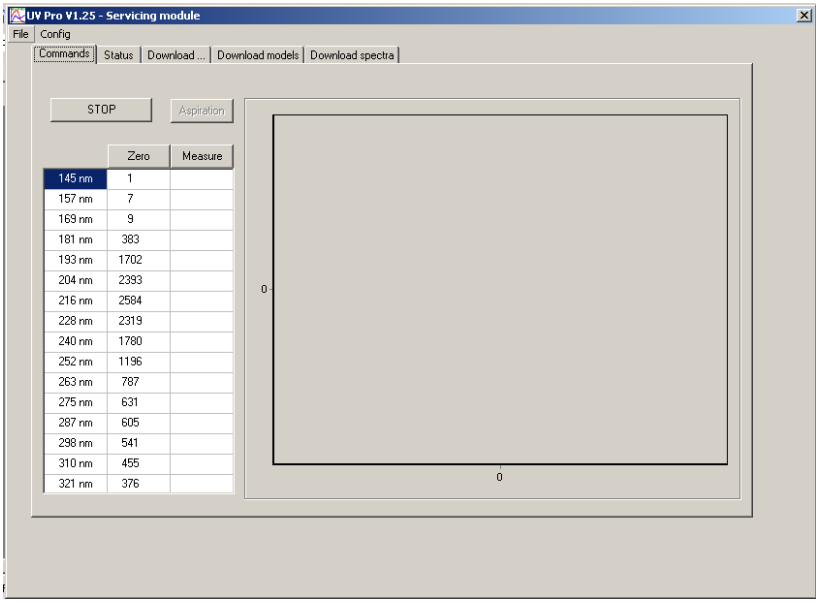
- Column 1: Wavelengths of measurement.
- Column 2: Energy of the lamp to each corresponding wavelength.
For a new lamp deuterium, the energy of the lamp read at 204 nm must be higher than 2000.

10.1.2 Online analyzer

For online analyzer, this module allows:
- To check the energy level of the deuterium lamp (reflecting its ageing),
- To check the cleanliness and the functioning of the flow through cuvette (bubbles, large impurities, dirty walls…),
- To check the “cleanliness” of distilled water,
- To check the functioning of the pinching valves,
- To check the functioning of the peristaltic pump,
- To realize the measurement of a “spot” sample.

10.1.2.1 Deuterium lamp checking

To test deuterium lamp energy:
- **Remove the cuvette**,
- Click on “zero” button.
The unit executes the measurement and displays



- Column 1: Wavelengths of measurement.
- Column 2: Energy of the lamp to each corresponding wavelength.
For a new lamp deuterium, the energy of the lamp read at 204 nm must be higher than 2000.

10.1.2.2 Flow through cell cleanliness checking

- Reinstall the flow through cuvette in its place after having to check the energy level of the lamp deuterium (see above).
- Aspirate the rinsing solution during 40 seconds (see paragraph “Checking of the analyzer parts”),
- Aspirate “clean” distilled water during 1 minute (see paragraph “Checking of the analyzer parts”),
- Click on “Zero” button.

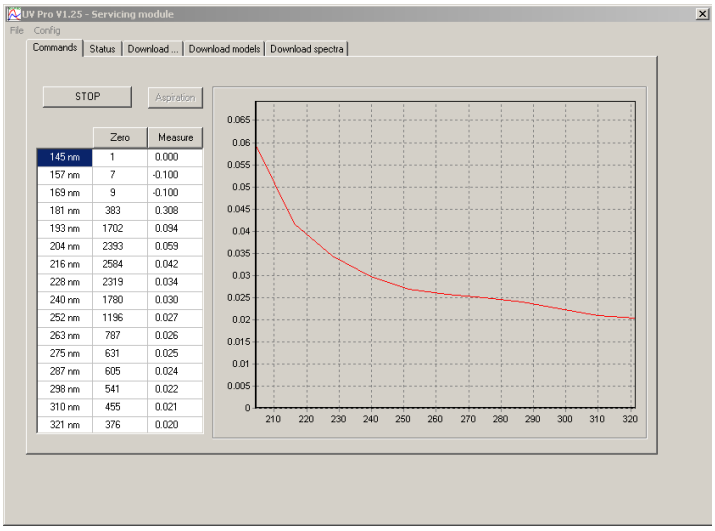
For a new deuterium lamp, “clean” distilled water and a clean flow through cuvette, the energy level, read to 204 nm, must be higher than 1500.

If the energy level to 204 nm is lower than 1500, check:
- The cleanliness of distilled water
- The cleanliness of the flow through cuvette panes,
- If there are not a bubble or a large particle trapped in the measuring chamber.

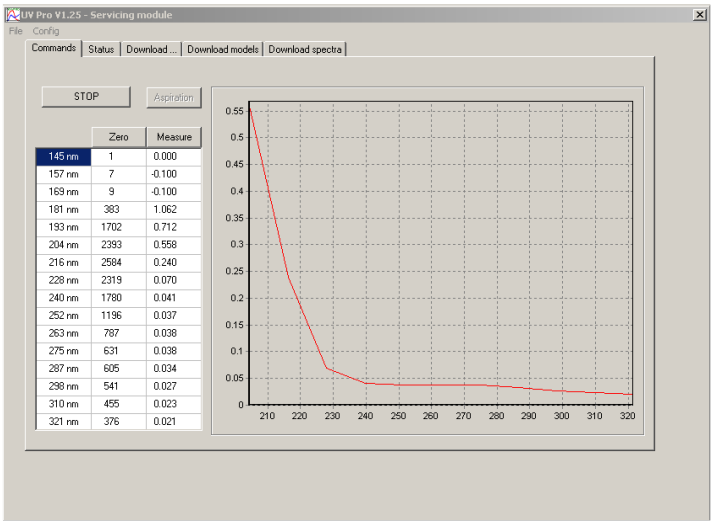
10.1.2.3 Distilled water “cleanliness” checking

To check the “cleanliness” of distilled water, proceed as follows:
- Remove the flow through cuvette,
- Click on “Zero” to make the zero on the air,
- Reinstall the flow through cuvette in its housing,
- Aspirate “clean” distilled water during 1 minute (see paragraph “Checking of the analyzer parts”),
- Click to “Measure”
- Appreciate the shape of the spectrum

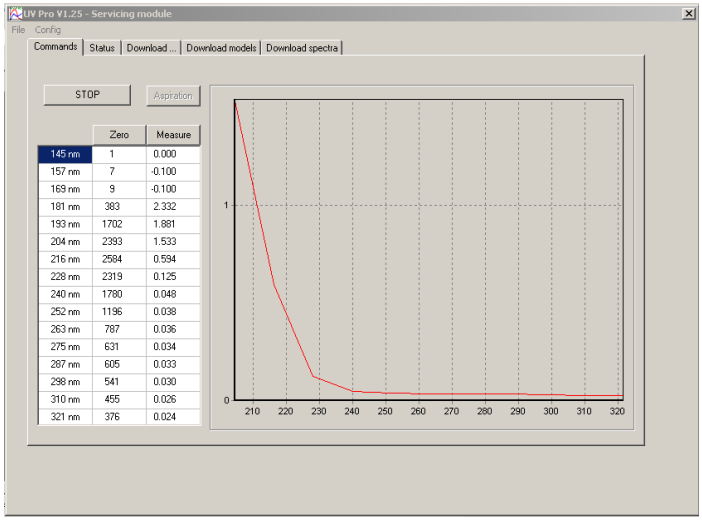
The spectrum of a “clean” distilled water must be slightly decreasing from 204 nm to 321nm, regularly (without peak) and little absorbing (< to 0,2 ABS with 204 Nm). See spectra on following page.



EX: spectrum of “clean” distilled water.



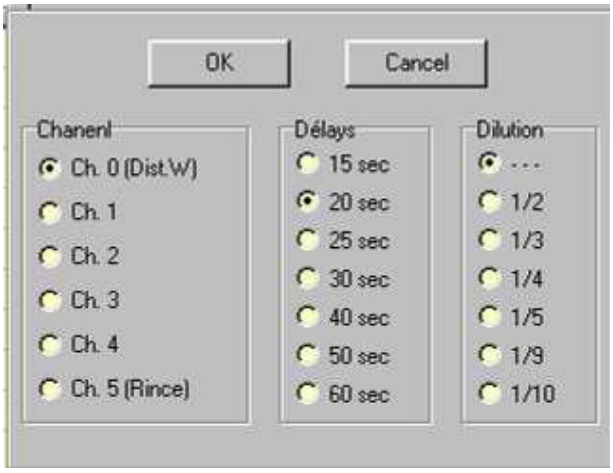
Ex: Spectrum of water containing approximately 7 mg/L of NO3



Ex: Spectrum of tap water (approximately 24 mg/L of NO3)

10.1.2.4 Checking of the analyzer parts

It is possible to check the operation of the pinching valves, the peristaltic pump, the circulation of the liquids in the pipe, the good course of dilution.
This control board also makes it possible to carry out controls of cleanliness of flow through cuvette and “cleanliness” of distilled water.
It will also serve for measurement of a “spot” sample.
For these operations, to proceed as follows:
- Click on the button “Aspiration”, the following screen appears:



The operator selects a channel (corresponding to a pinching valve), a time of aspiration and a dilution (--- = without dilution), then it launches the sequence while clicking on “OK”.
During the course of the sequence, it can check if the selected pinching valve opens and is closed correctly, if the peristaltic pump turns, if the liquid corresponding to the selected pinching valve goes up correctly in the tubulure. If it is a sample with dilution which was programmed, the operator can check, during the sequence of dilution the alternate opening of the pinching valve of the blank and that of the selected sample.

10.1.2.5 Measure of a "spot" sample

It is possible to measure a sample punctually.

With this intention proceed as follows:

- come back to the online analyzer main menu by pressing on "RET" key of the analyzer.
- connect the analyzer to the PC.
- put the analyzer under the control of the PC.
- launch UV-PRO software.
- select "File" and "Servicing module".

- click on "Aspiration"
- select "Ch. 5 (Rinse)", Delay "40 seconds" and dilution (---)
- click on "OK"
The analyzer rinses the flow through cuvette.

- click on "Aspiration"
- select "Ch. 0 (Dis. W)", Delay "60 seconds" and dilution (---)
- click on "OK"
The analyzer aspires the solution of blank.

- click on "Zero"
The analyzer makes the zero

- connect one of the channels (Channels from 1 to 4) of the analyzer to the "spot" sample to analyze.
- click on "Aspiration"
- select the channel "Ch. X", Delay "60 seconds" and dilution (y) *
- click on "OK"
The analyzer aspires the "spot" sample and carries out dilution if this one is programmed.
* (y) being the dilution ratio which will make it possible to have a spectrum of sample lower than 2 ABS

- click on "Measure"
The analyzer acquires of the spectrum of the "spot" sample.

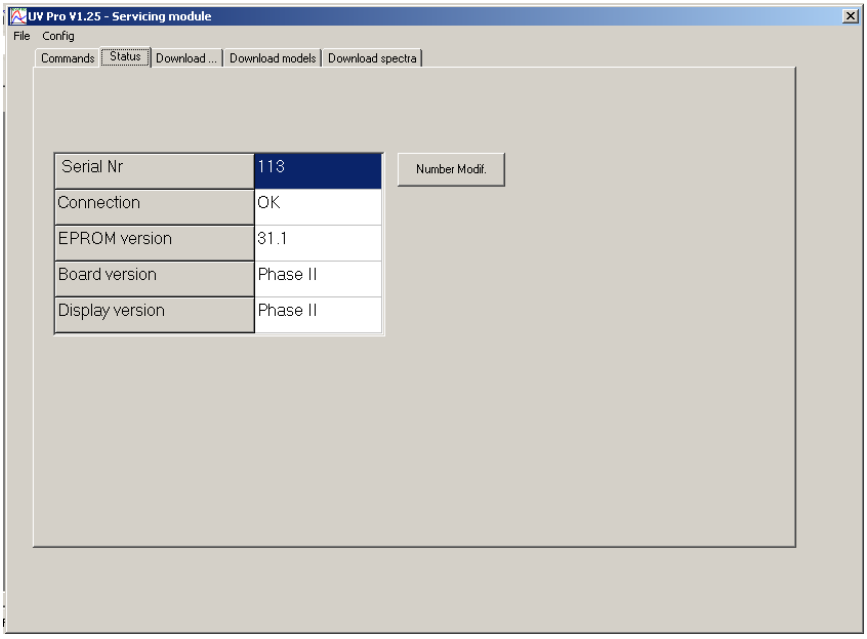
- select "File" and "save"
- choose the repertory where will be saved the spectrum of the "spot" sample.
- give a name.
It will be saved with extension ".SPT".

- return to the main menu of UV-PRO software.
- select "File" and "Spectrum module"
- select the spectrum of the "spot" sample.
- display the spectrum
- enter information concerning the spectrum (dilution ratio and optical way).
- re-saved the spectrum with extension ".SCN".

- launch a calculation of déconvolution after having chosen the adequate model.

10.2 "STATUS" INDEX

This index displays information on the traceability of the instrument.
In the event of problem, please communicate this information with the service after sale.

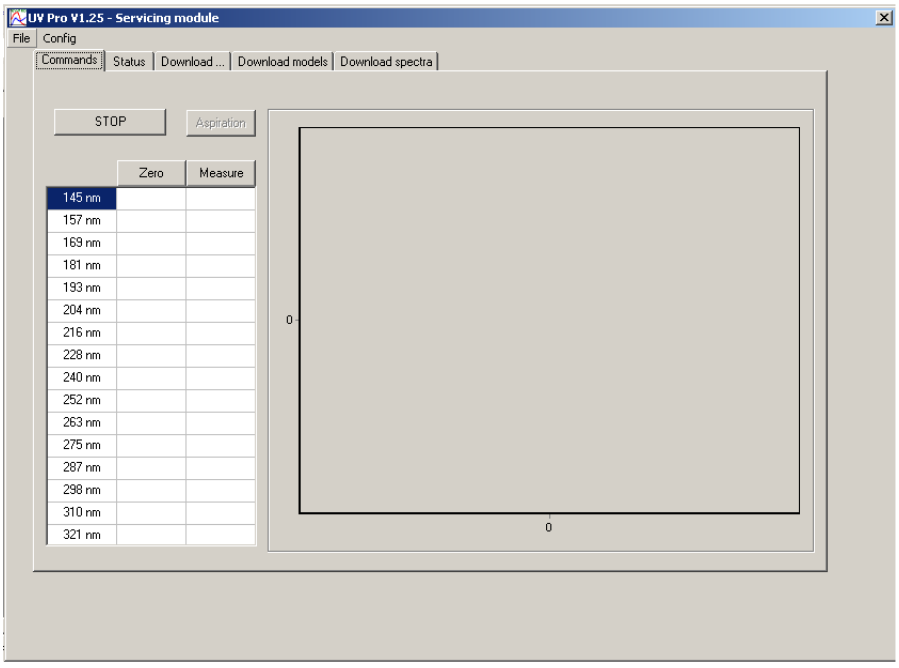


10.3 "DOWNLOAD MODELS" INDEX

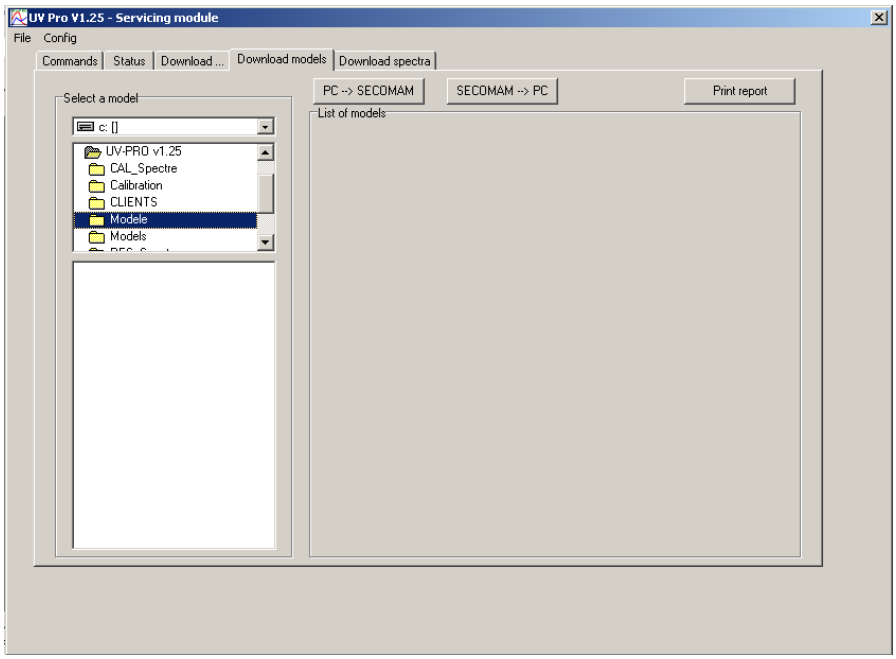
This sub-menu makes it possible to download models of the PC towards the online analyzer or PASTEL UV and conversely to recover models coming from these two instruments.

10.3.1 Models downloading towards the instrument

From that screen:

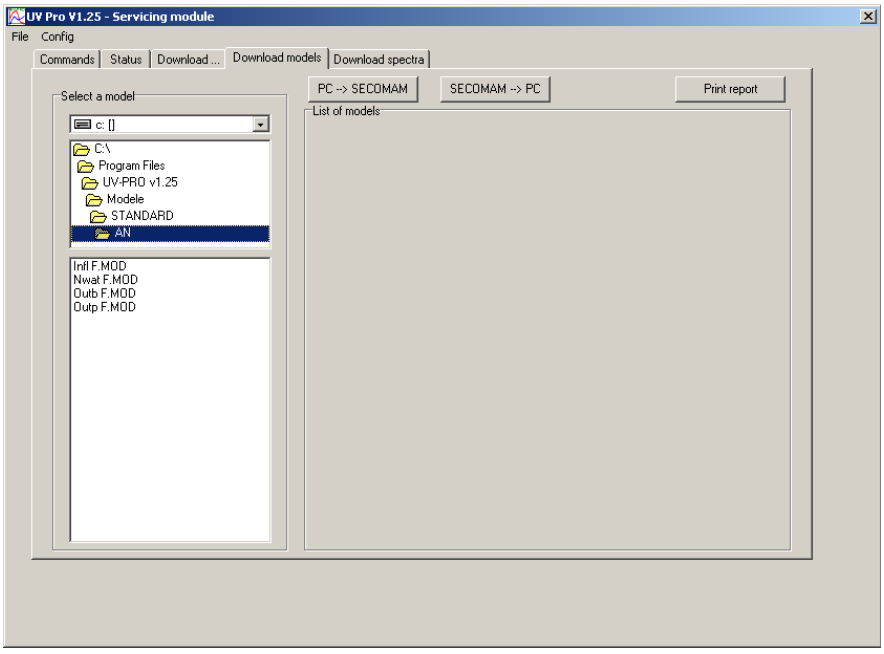


- click on "Download models".



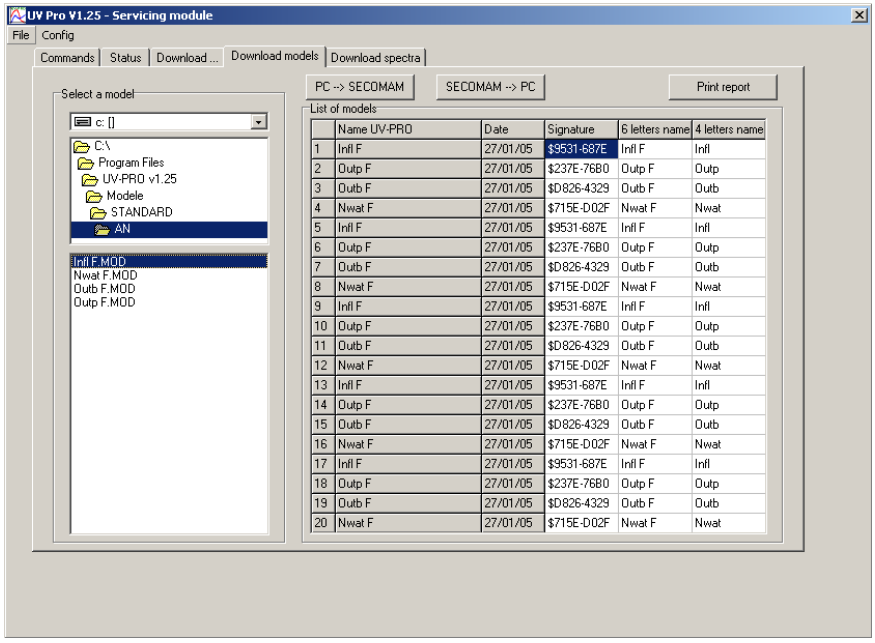
Inside left window,
- search the repertory in which is the models to download
(Ex: C:\Program files\UV-PRO v1.25\, Modele \ xxxx)

WARNING: Before downloading the models, it is imperative that they all are gathered in the same directory. It is from this directory that the following operations could be carried out.



- click twice on the model to download.
- do again the operation according to the model of instrument.

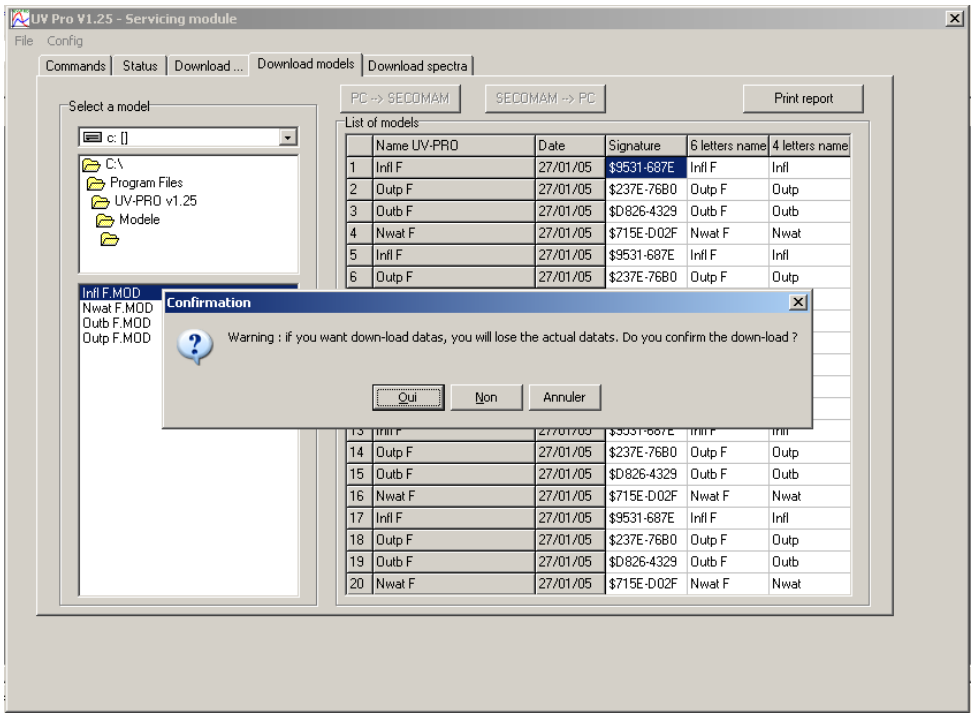
WARNING: For PASTEL UV, it is imperatively necessary to download 20 models. If the operator does not have 20 different models, it can download several times the same model.
For online analyzer, the operator cannot download more than 4 models.



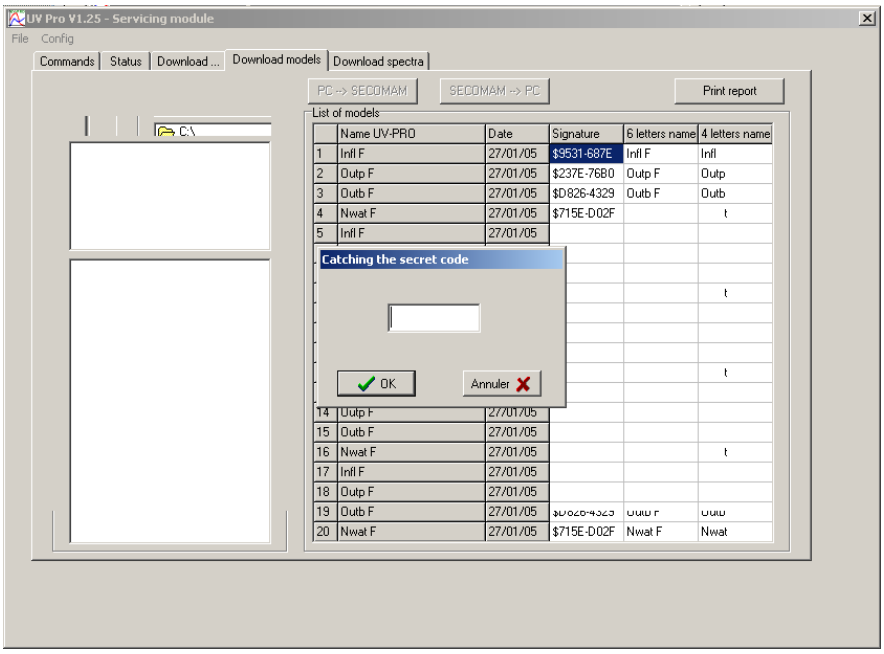
- column 1: number of the model in the order of the selection,
- column 2: complete name of the model.
- column 3: date of the model selection.
- column 4: signature of the model
- column 5: name of the model on 6 letters
- column 6: name of the model which will be used to program the apparatus.

NOTE: the signature, different for each model makes it possible to check on the apparatus that the model used corresponds to the downloaded model.

- click on “PC → SECOMAM”.

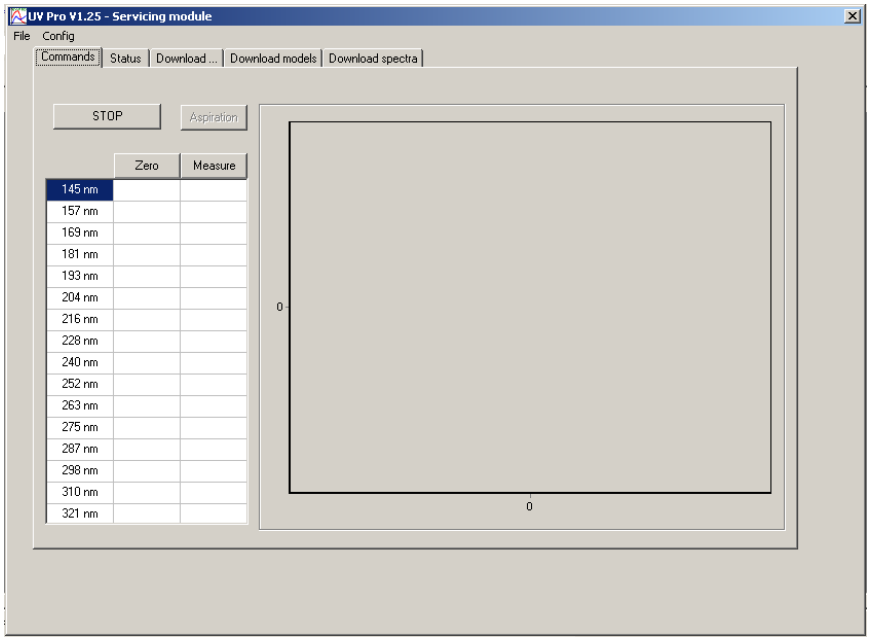


- click on “YES” to continue.



- Enter the secret code (000 by default).
- Validate.

The models are then downloaded towards PASTEL UV.



- Click on “Commands”.
- Click on “STOP” to start again PASTEL UV or online analyzer.

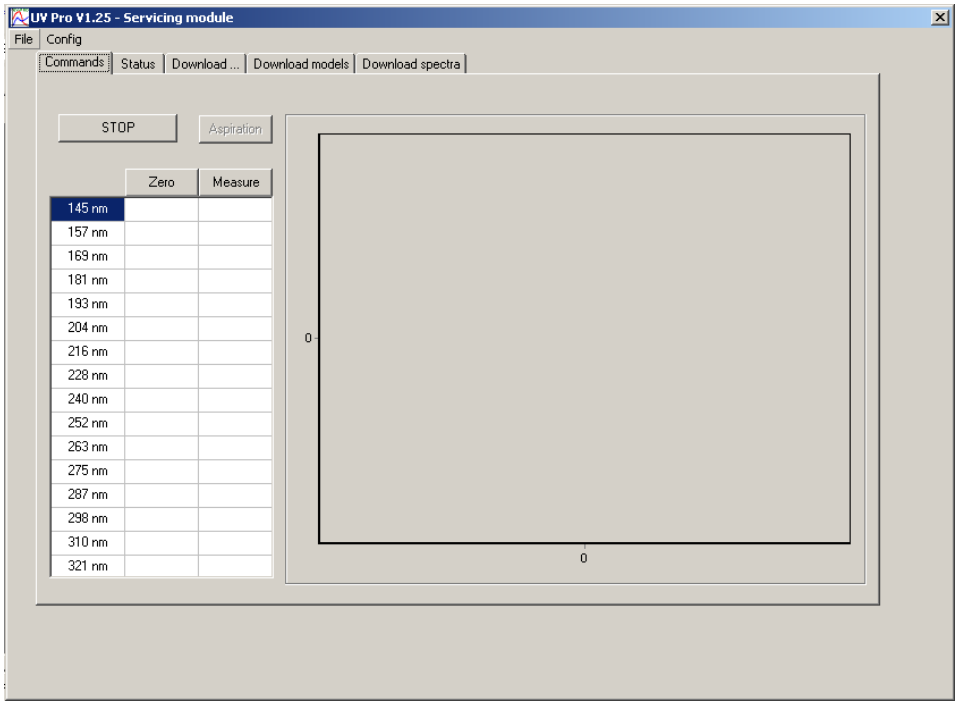
10.3.2 Recovery of the models on PC

Once PASTEL UV or the online analyzer is in communication with the PC, select in the left window the directory where the models will be saved (Ex: C:\program files\UV-PRO v1.25\Modele\ xxxx).

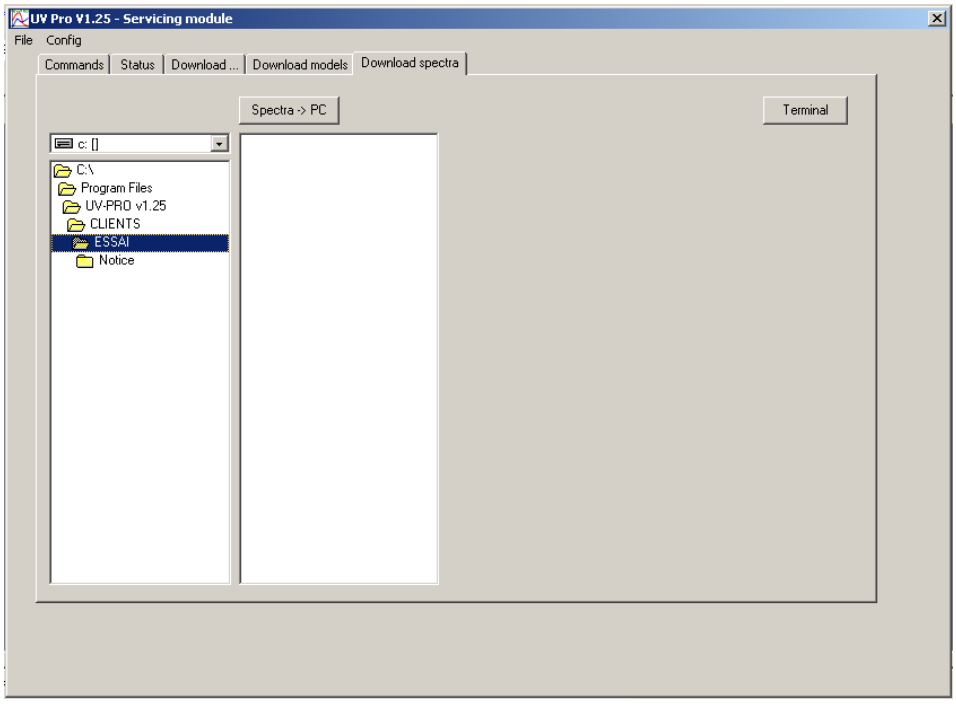
- Click on “SECOMAM → PC”. The models then are recovered and saved in the selected directory.

10.4 “DOWNLOAD SPECTRA” INDEX

From this screen:

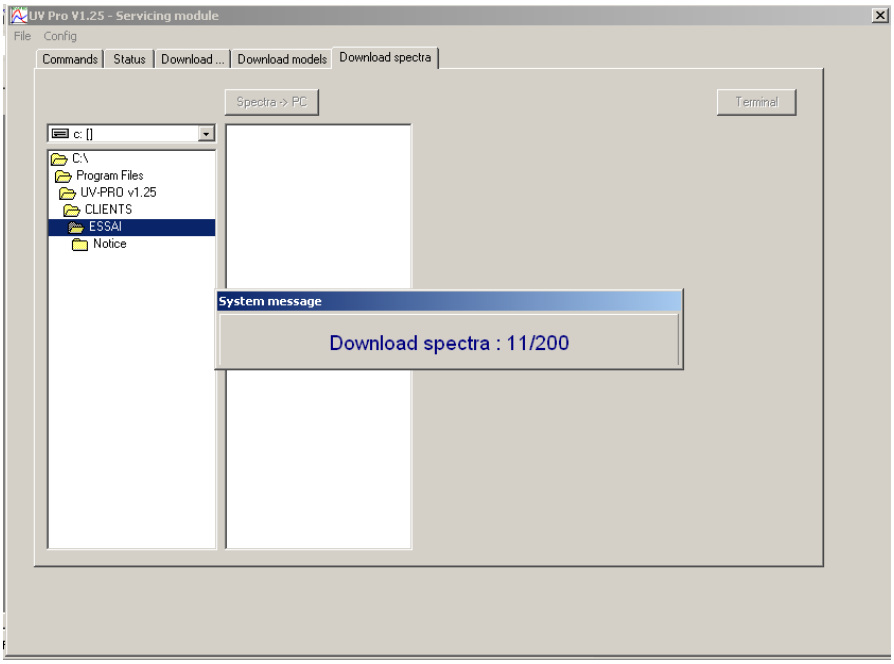


- Click on “Download spectra”.

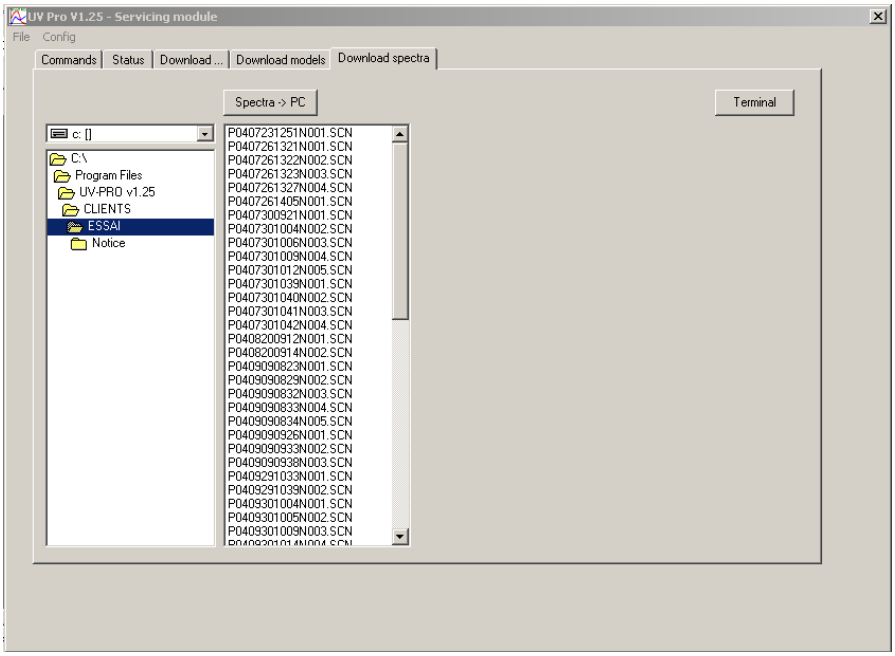


NOTE: In order to avoid the mixing of the spectrum files with other files, it is preferable to have created a directory (Ex: SPETRES) in which the remote loading will be done.

- Search in the left window, the directory in which the spectra will be downloaded.
- Click then on “Spectra - > PC”.



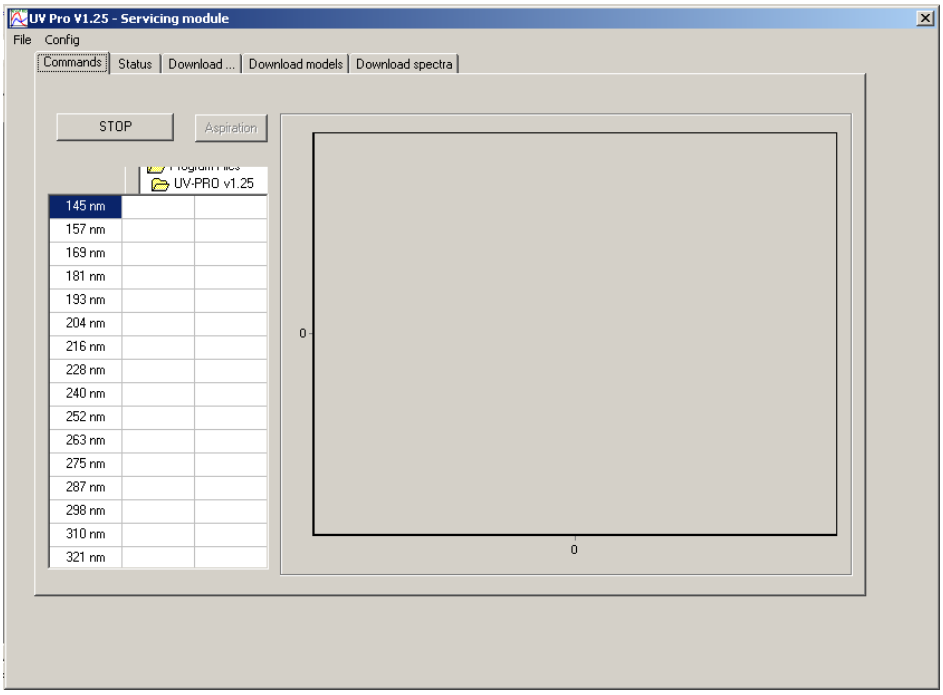
The remote loading of the spectra is automatic and can last a few minutes if there are a great number of spectra to download.
Once the spectra are downloaded, the screen is presented in the following way:



- Control each spectrum by “double clicking” on it to check if the absorbances are lower than 2,0 ABS for the wavelengths higher than 228 nm.

10.5 RETURN TO THE MAIN MENU

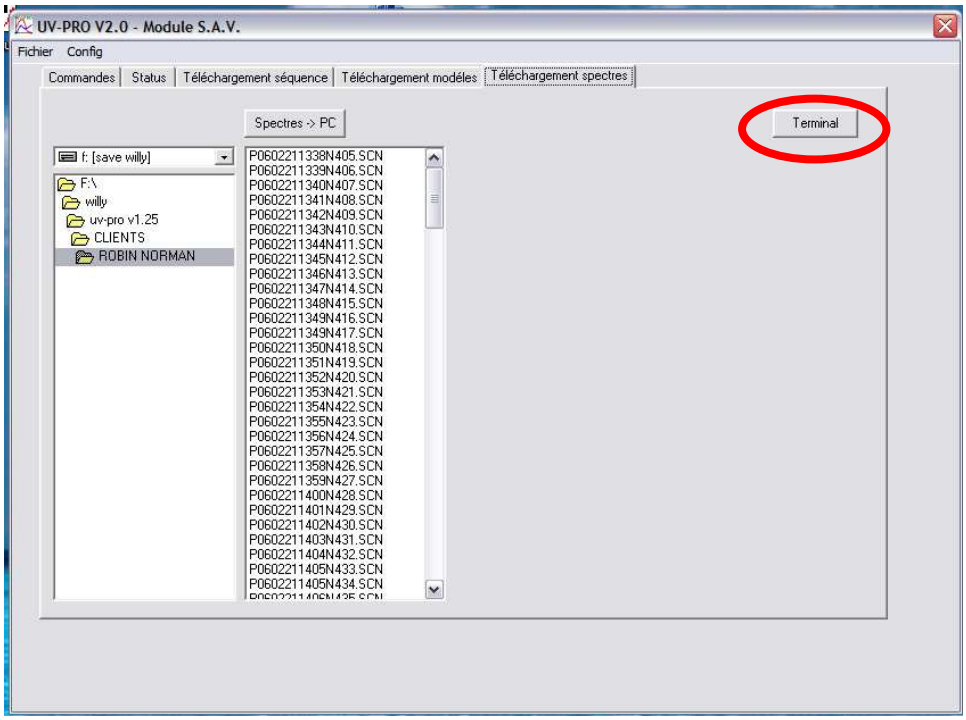
- Click on the index “Commands” when the remote loading of the spectra is finished.



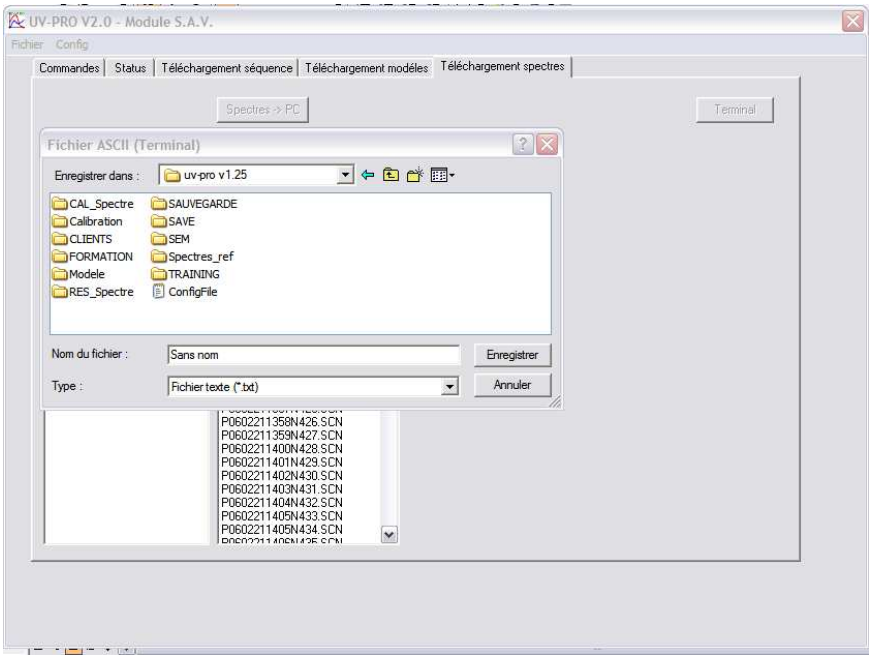
- Click then on “STOP” to return to the main menu of UV-PRO software.
PASTEL UV returns on its main menu
Online analyzer starts again a sequence of measurement.

10.6 RECUPERATION DES DONNEES PAR HYPER TERMINAL

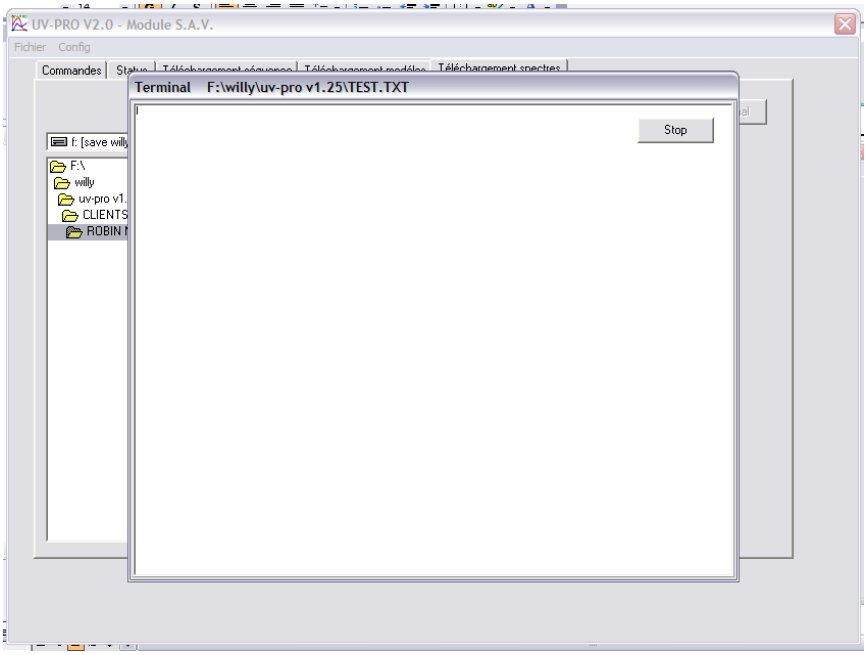
From this screen:



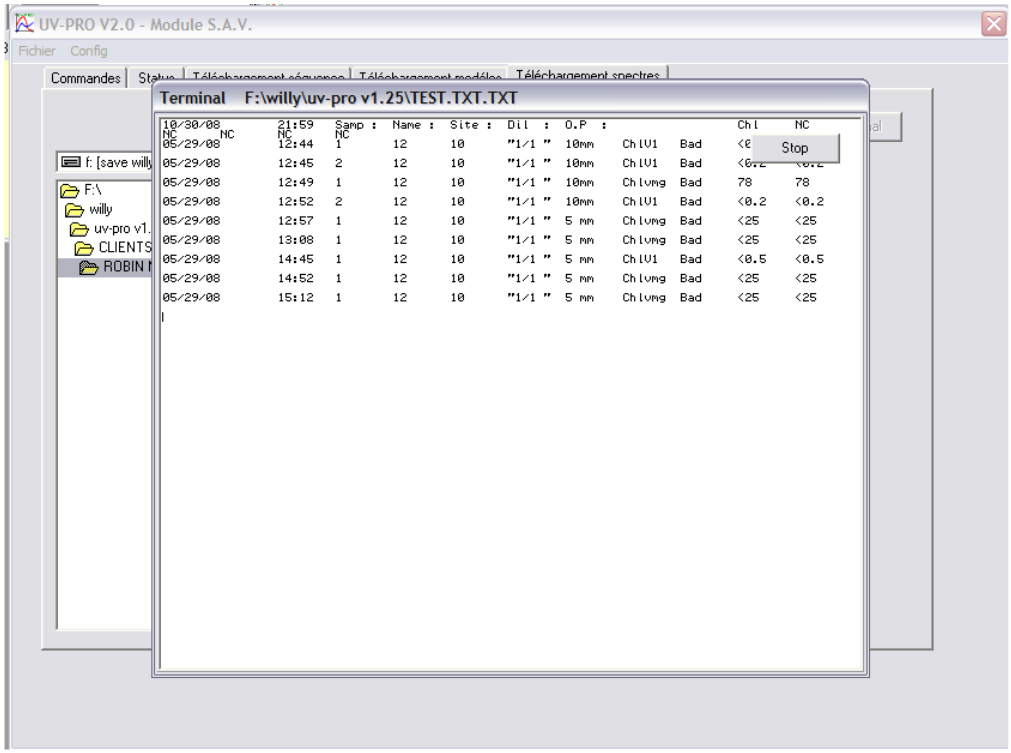
- Click on the button labelled « Terminal ».
It displays:



- Give a name to the file data will be saved.
- Validate.
It displays:



The computer is ready to receive data.
- Check the manual of the used analyzer for sending data.



Data format (.txt) is readable by Excel.

11 RECUPERATION MODULE

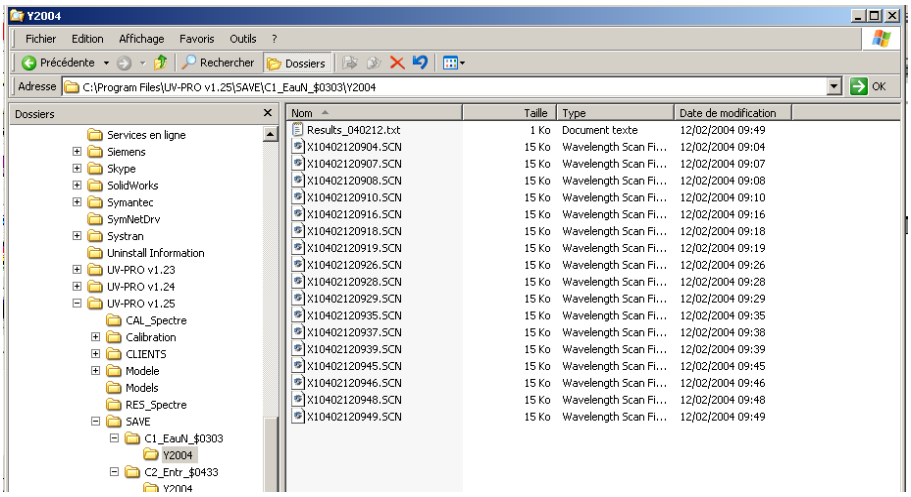
This module permits to recover in continuous and automatically spectra of samples with values of associated parameters (COD, TSS…) in an exploitable table under Excel.
It is only active when used with the ONLINE ANALYZER and through a simple connection with the PC by RS232C port, no particular procedure is necessary for this operation, data recuperation is done automatically.
This module is composed of three principal windows:

"Results" window: display of the spectrum and results
"Temporal Evolution" window: allows to visualize one or several parameters within a time limit (refer to the module 'open a model')
"Grid" window: display, following the selected channel, the associated parameters presented as a grid.

WARNING: In this type configuration, the link between the analyzer and the PC is mono directional. When launching the software, the following message appears:

- Click one on « NO » to have access to the software

NOTE: Upon starting, a sub-directory "SAVE" is going to be created within which all spectra and a table of values will be stored.
This safeguard is done automatically under the following form:



- Save
  - Number of channel and models signature.
    - Year of model acquisition.
      - Month of model acquisition
        - Results file: Results_040212.txt
          Spectrum name: X0402120904.SCN

Significance of coding

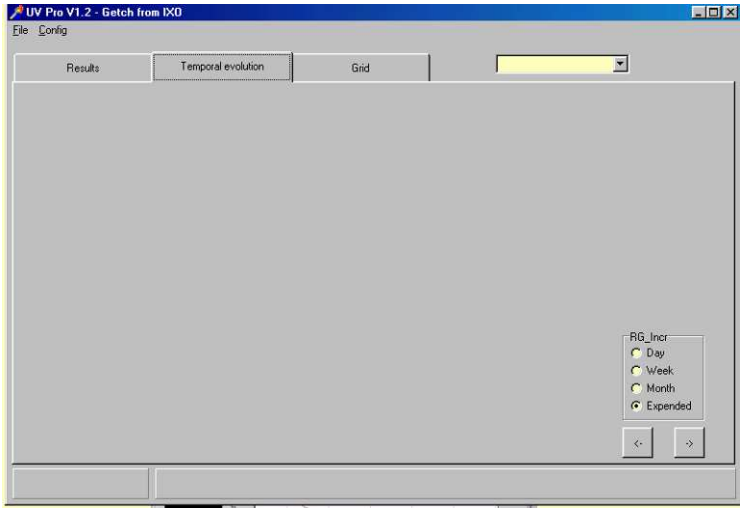
X40402120309.SCN
X: for IXO or STAC
4: for channel N°4
040212: for the date
0309: for the time

- Open the value table under Excel; it will be presented in the following way:

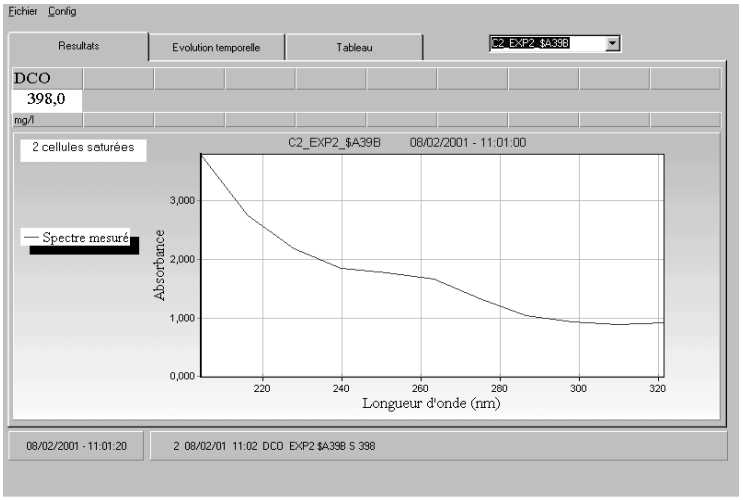
	TSS	COD	BOD	TOC	
12/02/2004 09:03	0.0	0.0	0.0	0.0	X40402120903
12/02/2004 09:14	0.0	0.0	0.0	0.0	X40402120914
12/02/2004 09:25	0.3	0.4	0.1	0.2	X40402120925
12/02/2004 09:33	0.3	0.4	0.1	0.2	X40402120933
12/02/2004 09:43	0.3	0.4	0.1	0.1	X40402120943
12/02/2004 09:53	0.2	0.3	0.1	0.1	X40402120953

11.1 “RESULTS” INDEX

Upon starting, before the first measure, the window opens as:



At the first measure, results of the first channel will inevitably be displayed.



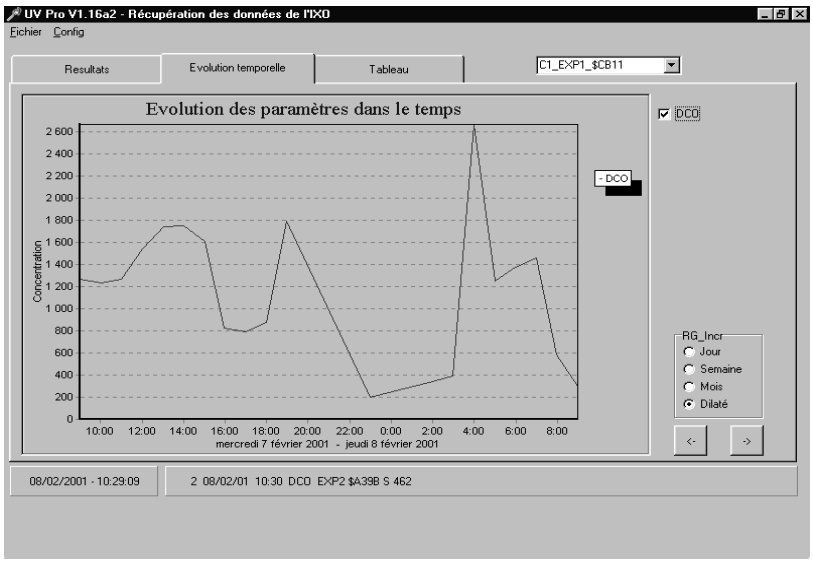
If you wish to visualize results of other channels, wait till the end of the first cycle so that the software can identify the number of channels.
Select on the scrolling window, upper right, the number of the selected channel. For example C2_EXP2_$A39B,
C2 corresponds to the number of second channel
EXP2 corresponds to the model name
$A39B corresponds to the model signature.

Below the result, at the left of the spectrum, appears a small window giving the following information:

- On conditions of measure:
  - 1 saturated photo diode
  - 2 saturated photo diodes
  - Saturated sample (more than 3 saturated photo diodes) and the result is not displayed
- On the quality of the measurement:
  - OK (good restitution)
  - Tolerable (restitution gap between 2 and 4%)
  - Bad restitution (gap of restitution beyond 4%)

11.2 "EVOLUTION" INDEX

Follow the evolution, with time, of all or selected parameters of the model, as well as the duration (day, week, month, dilated). By default, the evolution in time of one or several parameters is displayed in dilated mode.



VERY IMPORTANT: When the user quits the recuperation module to exit the UV-PRO software or to enter into another menu, only spectra and values table made during the measurement will be keep in memory. Parameters value of these "grid" will be deleted.
UV-PRO software does not allow re-displaying in the "Recovery module" the data (spectra and table of values) previously recorded.
The operator will use the "Spectrum module" to display the spectra and the calculation of deconvolution for the concentration values of the parameters.

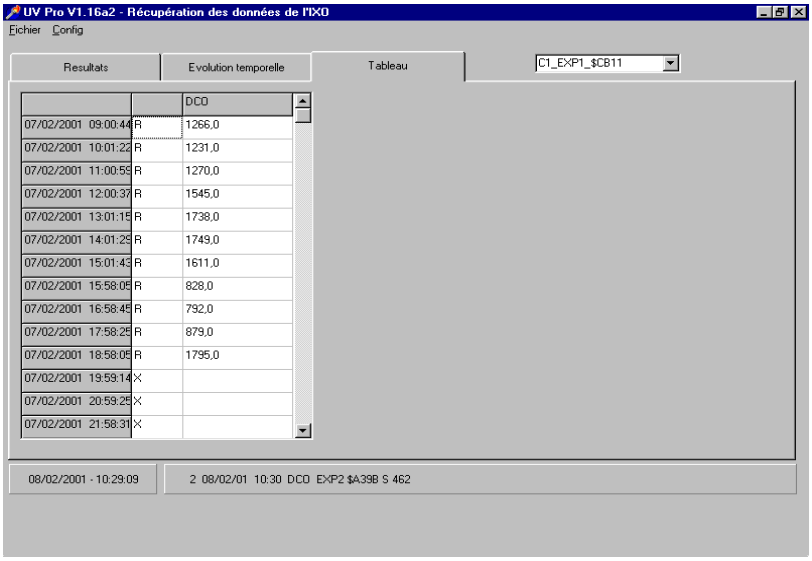
11.3 INDEX TABLE

In this index is displayed measurement after measurement and by channel the concentrations of the measured parameters.
The first column corresponds to the date and hour of measurement,
The second column indicates the quality and information of measurement indicated by a letter whose significance is as follows:

C: the absorbance of the spectrum of the first photo diode (204 nm) is over 2 ABS
S: the absorbances of the spectrum of the 2 first photo diodes (204 nm and 216 nm) are over 2 ABS
X: the absorbances of the spectrum of the 3 first photo diodes are over 2 ABS.
Nothing: the restitution (difference between the theoretical spectrum and the real spectrum of the sample) is lower than 2%.
R: the restitution (difference between the theoretical spectrum and the real spectrum of the sample) is between 2 and 4%
W: the restitution (difference between the theoretical spectrum and the real spectrum of the sample) is higher than 4%

The following columns correspond to the values of the parameters measured.

VERY IMPORTANT: When the user leaves the “Recovery module” to leave UV-PRO software or to enter all other menus of UV-PRO software, only the spectra acquired during measurement will be preserved. The values of the parameters of the index “table” as well as the temporal evolution will not be preserved.



12 ERROR MESSAGE

Message 1

Display of the following message at the time of the opening of one of the modules:

Check that 4 repertories
CAL_Spectre
Calibration
Modele
RES_Spectre
Are in the directory UV-PRO and they are spelled like above. The operator can add one or more repertories but cannot remove some.

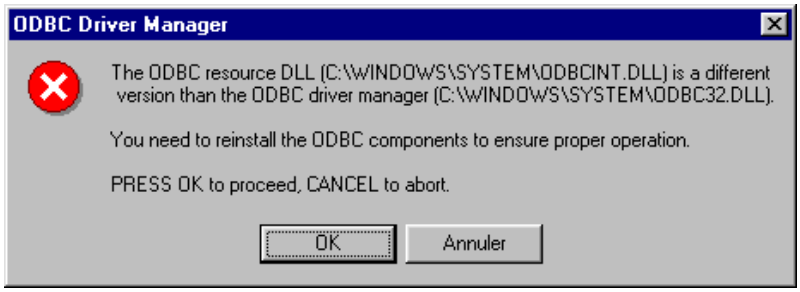
Message 2

Display of the message to the launching of UV-PRO software

Check, in the configuration, that the selected port is present on the computer.

Message 3

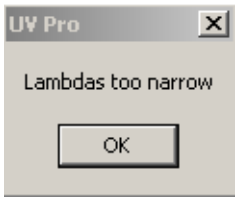
At the time of the installation of UV-PRO software on a computer having already received a former version of this software, the following message can appear:



To avoid having this message, it is necessary for starting the installation, removing the **ODBC32.dll** file in the **C:\SECOMAM** repertory and the **C:\WINDOWS\SYSTEM** repertory.

Message 4

Display of this message during the handling of the spectra



The selected wavelengths range in “Measure parameters” of the menu “Recalibration module” is not according to the wavelength range of spectrum used.
EX:
Selected wavelengths range: 205nm 322 nm
Spectrum wavelength range: 204 nm 321 nm

Message 5

Display of this message during the launching of UV-PRO software.

The software is already open, but it is nevertheless possible to use it except for a measurement of spectra.
Check that there are not other applications which use the same communication port.

Message 6

ANTHELIE and Uvi Light message

- Check that the beam of measurement is not blocked (removed the cuvette of measurement).

Message 7

ANTHELIE and Uvi Light message

- Check if halogen lamp is working correctly.

Message 8

Message ANTHELIE and Uvi Light

- Check if the wavelengths are correctly adjusted.

Message 9

ANTHELIE and Uvi Light message

- Check that the chopper motor turns correctly.

Message 10

ANTHELIE and Uvi Light message

- Check if halogen lamp is working correctly.
- Check if deuterium lamp is working correctly.

"Error ES/82" message

This message means that the repertory "Save" of spectra acquisition and the values table is saturated (too much spectrum in this repertory). This repertory is used in the menu "Recovery Module" to save the spectra and the data in real time.
Its maximum capacity is 21844 spectra (314 Mo).Erase the useless data.

OTHER PROBLEMS

**** The laboratory values are erased in the "calibrator" when the operator launches calculation***

In Windows:
- Select in "Start", "Parameter", "Configuration panel"
- Open "Regional and linguistic Options"
- Click on "Personalizing" in the index "Regional options"
- Click on the index "Numbers"
- For the "Decimal symbol", choose a dot (.) in the place of a comma (,).

*** The operator does not manage to open a model in the module "Open a model".**
- Enter in the "Recalibration module"
- Open the model which poses problem.
- Re-record this model under a new name.

.

13 LEXIQUE

- **Calibrator:** Process allowing determining calibration coefficients of reference spectra for a parameter by taking into account a multitude of sample data**.**
- **Contribution Coefficient**: Represents the influence of each reference spectrum contained in a sample spectrum (these coefficients are obtained through deconvolution).
- **Calibration Coefficients**: Coefficients indicating the part of reference spectra within a parameter.
- **Deconvolution**: Calculation process allowing to determine the contribution coefficient of each reference spectrum to the value of a measuring parameter such as COD, TOC …
- **Administrator or programmer:** intervenes in all functions of the software**.**
- **Model**: a model is composed of reference spectra as well as calibration coefficients necessary to determine the concentration of one or several parameters. It is identified by has name (for example « Entry of station »).
- **Parameter:** Name of the compound of which one searches for the concentration (for example the COD, the TOC, nitrates).
- **Results:** containing information specific to each sample (for example: date, place of sampling…) as well as the calculated numeric values obtained with the help of a model.
- **Spectrum:** Graph representing a grid of values which come in pairs (wavelength, Absorbance).
- **User:** corresponds to the operator who has the access to the simple functions of measures.

Pour plus d'information, rendez-vous sur www.secomam.fr

For more information, go to www.secomam.fr

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