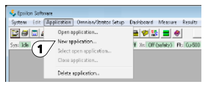
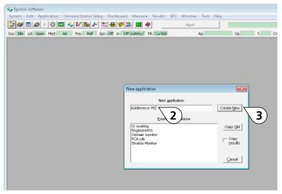
Creating a Typical Application and Measuring Unknown Samples

Creating New Applications

Launch the **Epsilon software**.

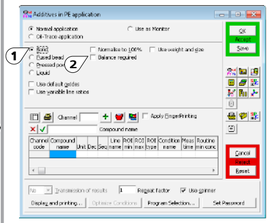


1. From the Main menu:
   - Select **Application**
   - Select **New application**.



2. Type the name of the new application, in this case **Additives in PE**.
3. Select **Create New**.

Filling in the Application Window



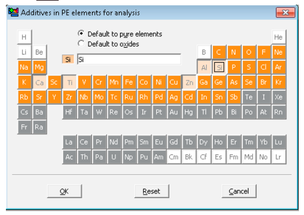
1. Select the type of sample to be analyzed, **Solid** for this application.

Following selection, several options are activated.

2. In polymeric applications, a **Balance** is often required.

Adding Elements of Interest

1. Elements can be selected from the periodic table. In this case we will use the pure element forms. Elements of interest in this application are: Al, Si, Ca, Ti, and Zn and C which represents the balance CH_2. To display the periodic table, click on C can only be entered manually.

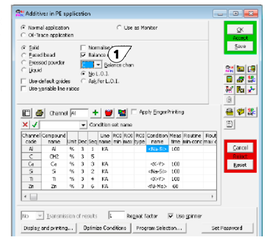


2. Once the elements are selected they will be added to the application window.

Note:
CH2 must be entered as compound name.

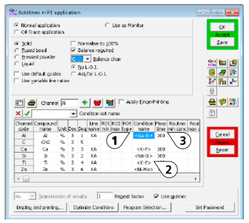
Adding Flux used

1. It is important to indicate whether a flux has been used, as well as the formula and weights or volumes of the substance used. These are taken into account in the calibration calculations. In this example, Lithium Tetraborate ($Li_2B_4O_7$) was used as the flux in a ratio of
1 g sample to 4 g flux having a final weight of 5 g. You may also need to account for LOI (Loss on Ignition).



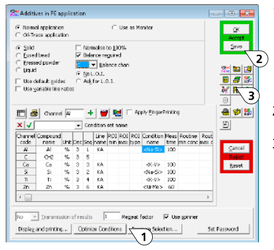
Applying Condition Sets

The condition sets are proposed automatically, but can be changed afterwards.



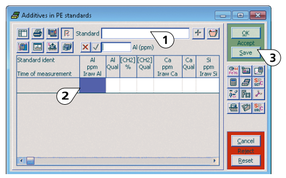
1. The **Condition Name** column specifies the condition conform which each element must run.
2. **Al** and **Si** will be measured on the **<Na-Si>** condition.
   Ca and **Ti** will be measured on the **<K-V>** condition. **Zn** will be measured on the **<Ni-Mo>** condition.
3. Also enter the time that the sample is to be analyzed for each condition set under **Meas Time** (for example 100 s).

Optimizing Conditions



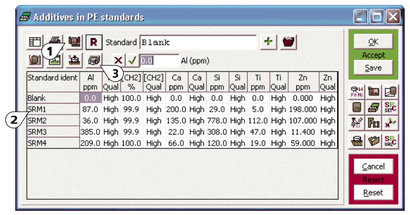
1. To optimize the conditions, click on **Optimize Conditions** and follow the instructions.
2. Save the application.
3. Click on **Standards** to move to the standards screen.

Adding Standards



1. Enter the names for the standards used.
   Add all standards to the list by typing in the name and clicking on +.
2. Fill in the known concentration values for each standard.
3. **Save** the standards data.

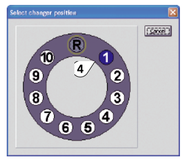
Measuring Standards



1. Prior to measuring the standards, press the **Calculate Default Line Groups** icon.

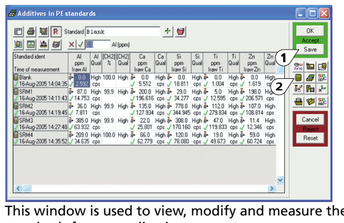
Note what position each standard is located in on the sample tray. The cover can also be left open during this operation so that you can see the sample location.

2. Highlight the first standard by a single mouse click.
3. Click the **Measurement** icon.



4. Indicate in which position the sample is located by clicking on the sample position. Repeat this process for each standard.

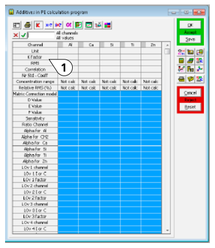
Deconvolute Spectra



1. Save the standards.
2. Click the **Calibration calculation** button.

This window is used to view, modify and measure the calibration standards for an application.
The names of the standards, and the concentrations of the various compounds (along with dilution and loss on ignition information if required) are all contained on this window. It is also possible to view (but not modify) the raw or corrected intensities for the standards.

Calculating the Linear Regression



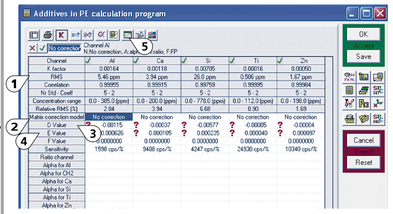
1. Click the cell **Channel** to highlight the entire table in blue.
2. Once the table is highlighted follow the sequence below:

   a. Press X-T.

   b. Press Cr.
   When you are asked to set the alphas to zero: Click **Yes**.

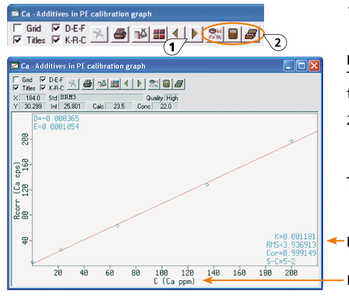
   c. Press .

Calculated Linear Regression



1. **RMS** = Standard error
   Correlation = Goodness of fit
2. **Matrix correction model**
3. **D** = Intercept
4. **E** = Slope
5. Once all the calculations are complete click on to view the individual calibration graphs.

Calibration Graph



1. Arrows to move from element graph to element graph.

Note:
To exclude a flyer, left-click on the point, then right-click for the pull-down menu to select **Toggle Quality**.

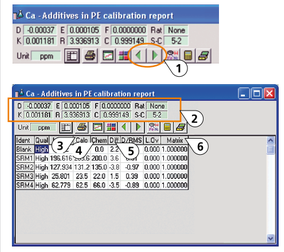
2. Icons to move you back to the **Application** window, **Linear Regression Calculation** window and the **Standards** window.

To obtain an element calibration report, click on .

RMS = Average Standard Deviation of all Points.

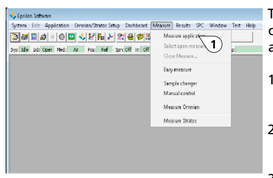
Element of interest

Calibration Data



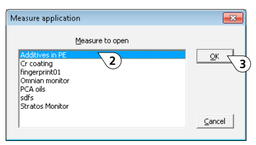
1. Arrows to move to the next or previous element.
2. Calibration graph statistics.
3. **Calc**ulated concentration base on the calibration graph.
4. **Chem** = chemical concentration.
5. **Diff** = calculated concentration - chemical concentration.
6. **Matrix** correction factor being applied.

Measuring an Unknown Sample

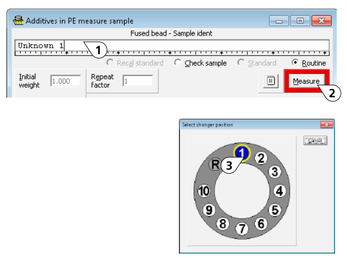


Test the calibration by measuring one of the standards as an unknown against the calibration.

1. Select **Measure > Measure application** from the menu.
2. Select the application of interest, in this case **Additives in PE.**
3. Click **OK**.

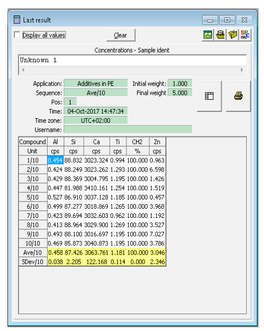


Measuring an Unknown Sample (continued)



1. A measurement window will open, type in the sample identification.
2. Once all the information is correct select **Measure**.
3. Select the position that the sample is located in on the sample tray.
   This will start the measurement.

Measuring an unknown sample (continued)



Results are shown for the measurements of **Unknown** 1 sample.

Note:
The application repeat factor is set here to 10.

Epsilon 4 Quick Start Guide

Typical application

4023 000 67901 Edition 1

PANalytical