July 2021 - Quick start manual - Xyztec bv

Sigma HF

World's most powerful bond testers

xyztec

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Contents

1 Warning/safety instructions and procedures

This bond tester complies with current safety requirements. Inappropriate use can, however, lead to personal injury and damage to property. To avoid the risk of accidents and damage to the machine, it is required to read these instructions carefully before using it for the first time. It is the responsibility of the user to maintain knowledge of these instructions over time. They contain important information on its safety, use and maintenance. In case any part of this document or of the tester usage is unclear to the reader or the user, discontinue usage immediately and contact Xyztec in written form.

1.1 Correct application

- Bond testers are designed as an invaluable tool during the design process and for manufacturing quality control to ensure optimum yield and the very best product reliability.
- This machine is not suitable for outdoor use and must be used in a safe and stable indoor environment.
- It must only be used to test bonds. Any other use is not permitted. Xyztec cannot be held liable, accountable or culpable for damage resulting from any usage of the machine, including incorrect or improper use or operation.
- This bond tester is not intended for use by people with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning its use by a person responsible for their safety. The tester also may not be used by children. Never attempt to use the machine when any safety feature is not in place or operational, or when any person or animal is inside the tester.

1.2 Technical safety

- Observe the instructions in “Installation and connection” and “Specifications” at all times.
- Before setting up or using the machine, check it for any externally visible damage. Do not install or use a damaged machine.
- The electrical disconnector must be easily accessible after installation so that the machine can be disconnected from the electricity supply if necessary.
- Unauthorised repairs can result in unforeseen dangers for the user. Repairs may only be undertaken by a Xyztec authorised service technician. Failure to comply with this requirement voids the warranty. The end user is always responsible for the operation of the tester.
- After activation of the EMO-button control circuits and the computer remain active.
- In order to correctly and safely use the system described in this document, it is essential that the safety procedures and the safety precautions specified in this manual are followed!

1.3 Personnel qualification requirements

Operation, adjustment, maintenance, and repair of any system may only be carried out by qualified and trained personnel.

In this document, the assumption is made that operators, maintenance personnel and service personnel are properly trained in the tasks that they are intended to perform.

The following training levels are defined:

- Maintenance/Service
- Supervisor
- Operator

NOTE: For each level is a training available

1.4 Basic safety rules

- Do not use the system in an environment where flammable gasses are present or where it is extremely dirty.
- If any personal protection equipment (PPE) is mentioned, it should be used in accordance with the manufacturer's instructions.
- Do not defeat or bridge safety devices, connectors, etc.
- Use only Xyztec recommended spares and tools.
- Keep your fingers and other body parts outside the machine. .

1.5 Safety labels

The Xyztec Sigma HF system systems contain safety labels as described below.

Pictogram	Category	Meaning
	INSTRUCTION	Read in the Technical manual the Safety chapters.
	WARNING HIGH VOLTAGE	Contact may cause electric shock or burn. Turn off & lock out system before servicing. Follow the Lockout Tagout procedure described in chapter 1.5 before servicing.
	WARNING CUTTING FINGERS	Serious injury to hands. Keep hands away from moving parts. Follow the Lockout Tagout procedure described in chapter 1.5 before servicing.
	WARNING CRUSH HAZARD	Serious injury to hands. Keep hands away from moving parts. Follow the Lockout Tagout procedure described in chapter 1.5 before servicing.
	WARNING FINGER/HAND CRUSHING	Serious injury to fingers. Keep hands away from moving parts. Follow the Lockout Tagout procedure described in chapter 1.5 before servicing.
	WARNING ONLY AUTHORIZED PERSONNEL	ONLY authorized personnel may service this equipment. See manual for safety information. Follow the Lockout Tagout procedure described in chapter 1.5 before servicing.
	DANGER CRUSHING HANDS	Serious injury to fingers. Keep hands away from moving parts. Follow the Lockout Tagout procedure described in chapter 1.5 before servicing.

1.6 Location of the safety warning labels

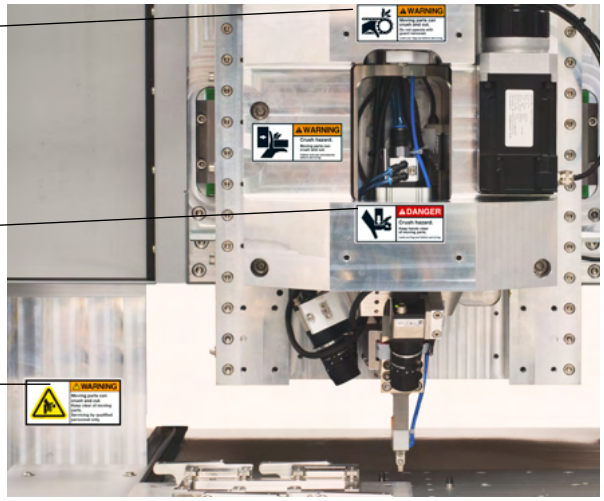


Figure 1: Safety labels inside Sigma HF.

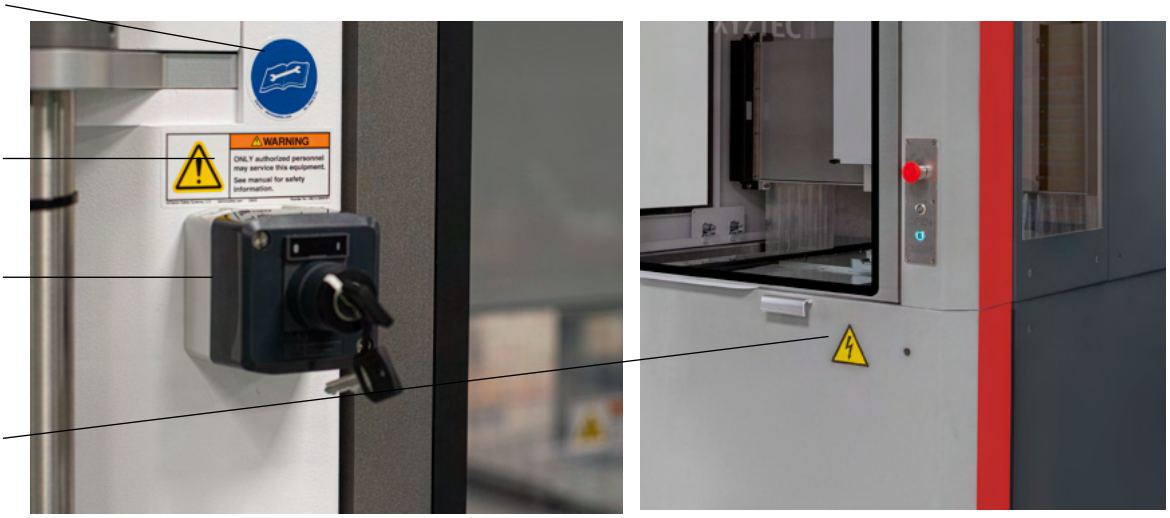


Figure 2: Safety labels outside Sigma HF.

Legend

1. Warning of moving parts can crush and cut
2. Warning of finger/hand crushing
3. Warning of cutting fingers
4. Read the technical manual
5. Warning: Only authorized personnel may service
6. Safety override switch
7. Warning of high voltage

1.7 Description of safety devices and procedures

	SAFETY DEVICES	HAZARD	DETECTION METHOD	MACHINE CONDITION AFTER THE SAFETY DEVICE IS ACTIVATED
1	Safety interlock	Hazardous moving parts	Safety circuit interruption by opening the front guard	All moving parts will be stopped and the servo power is removed.
2	EMO (Emergency Off) button at the front	Hazardous moving parts	Safety circuit interruption by operating the EMO button	All moving parts will be stopped and the servo power is removed.
3	Electrical disconnect	Hazardous voltage	Mains power supply to the machine is disconnected by turning the electrical main switch “off”	All power to the system is turned OFF except the PC power supply
4	Electrical disconnect “Lockout Tagout”		Mains power supply to the machine is disconnected and locked out.  Shut down the equipment in an orderly manner. Disconnect the systems electrical energy by turning the main electrical switch to “OFF” (2) Affix the energy isolating lockout/ tagout devices by using a padlock and appropriate tag (1). Verify that the equipment has actually been isolated and deenergized.	
5	Air disconnect “Lockout Tagout”	Hazardous air pressure	Main air supply to the machine is disconnected by turning the main air switch “off”	
6	Air disconnect “Lockout Tagout”		Main air supply to the machine is disconnected and locked out.  Shut down the equipment in an orderly manner. Disconnect the systems air supply by turning the pressure down to 0 bar. (2) .	

		Affix the air isolating lockout/tagout devices by using a padlock and appropriate tag (1). Verify that the equipment has actually been isolated and deenergized	
7	Remote control disconnect “Bockout Tagout”	The internet connection to the machine is disconnected and locked out – preventing remote control.  Disconnect the RJ45 cable from the jack module. Snap the blockout device into the RJ45 jack module (1). Affix tagout notice that the remote control has been disabled. The blockout device can be retracted using the special removal tool (2). Tools delivered are for supervisor level use only.	The RJ45 jack blockout device prevents any remote access to the equipment.

1.8 Low speed mode for commissioning and observation

NOTE: This low speed mode is strictly intended for commissioning and observation only. For servicing any part of the system, follow the “lockout/tagout” procedure described in chapter 1.5 so that the system is de-energized and locked out.

Before activating the “slow speed mode” the following safety procedure must be followed: Being careless and/or not following this safety procedures can cause serious injury.

1. Disable the remote control functionality by following the remote control “Bockout Tagout” Procedure as described in chapter 1.5. The RJ45 jack blockout device prevents any remote access to the equipment while in the “low speed mode”.

2. The “low speed mode” can only be enabled by activating the safety override switch and after accepting the pop-up screen warning.

Only qualified service personnel have access to the key for activating the “low speed mode” switch, tools for lockout/ tagout procedures and tools for taking off the covers or opening the controller box. The key together with the conscious acceptance in the software overrides the safety interlock function and puts the servo drive into “slow speed mode”. Once the equipment is switched to this “low speed mode” keep body parts away from all moving parts in the system.

2 Operating the Sigma HF

The Sigma HF tester is especially designed to work with high forces (up to 1000kgf) and larger areas (see specifications). This tester is equipped with full safety guarding for more extensive safety precautions and a stack light on top of the safety guarding to represent the machine mode. Placement of certain parts or the look of certain items may vary.

Figure 3: Front Sigma HF

Legend

1. Stack light
2. Emergency swtich
3. Drawer to access computer and debris tray
4. Power switch
5. EMO (Emergency Off) switch
6. Open button
7. Close button
8. Air supply

3 Installation and connection

3.1 Installing the Sigma HF

The following steps need to be performed to correctly install the machine:

1. Unpack the machine
2. Place the machine on a stable floor
3. Take off all covers (see 3.3 for instructions)
4. Anchor the machine for protection during earthquakes (see 3.2 for instructions)
5. Level the machine correctly by adjusting all four feet
6. Connect the cable to the power supply (3 phase). The equipment should be protected by an external fuse type 50A Class J and 300 mA Earth Protection Switch
7. Plug in the air supply with at least 6 bar of air pressure

Put back all covers before switchining on the machine

8. Plug in the pc mains (1 phase)
9. Open the drawer
10. Switch on the pc
11. Switch on the machine

3.2 Anchoring the Sigma HF (Seismic protection)

For protection during an earthquake, the machine can be anchored to the floor:

1. Mark the holes in the feet with an e.g. felt-tip marker on the floor
2. Take the machine away to get access to the hole positions
3. Drill the holes and place the floor anchors or rawl bolts
4. Replace the machine
5. Check the leveling of the machine.
6. Secure the machine by tightening the lock nuts using a hook spanner.

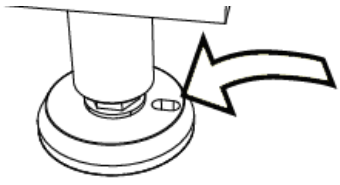


Figure 5: Holes in the feet to anchor the machine to the floor

3.3 How to take off / mount the covers

The following steps need to be performed to take off the covers:

1. Make sure the machine head is in a safe position
2. Open the door
3. Switch off the machine
4. Turn off the power switch
5. Lock the main switch with a padlock to prevent it from being switched on while the machine is not in a safe position
6. Use a hexagon 10mm to take off the covers and always start with the upper covers
7. Take off upper covers
8. Take off lower covers

To mount the covers, follow the steps in reverse order.

3.4 How to open the front door while machine is not powered (for service technician only)

The following steps are needed to do this:

1. Switch off the machine
2. Turn off the power switch
3. Lock the main switch with a padlock to prevent it from being switched on while the machine is not in a safe position
4. Use a hexagon 10mm to take off the covers and always start with the upper covers
5. Open the upper right (window)cover
6. Use a “Philips” screwdriver to unlock the safety interlock by turning the small disable switch (number 6) to the right.

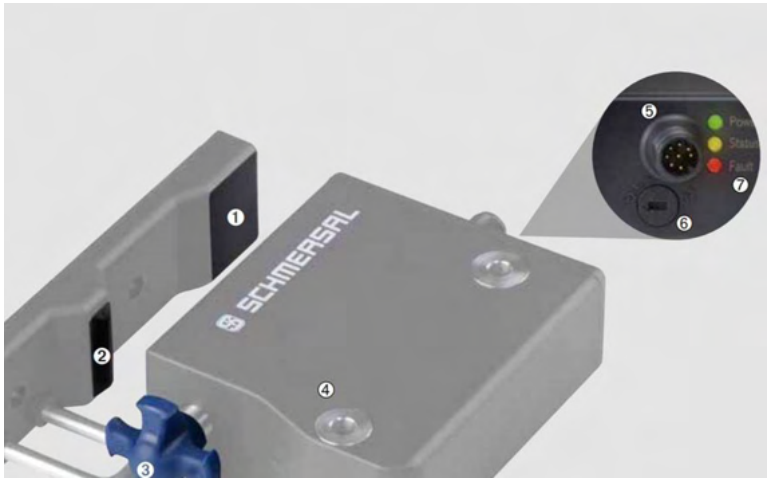


Figure 6: Unlock the safety interlock by turning the small disable switch (number 6) to the right.

7. Now the interlock will not lock the door anymore
8. Make sure that the interlock is set to safe position after maintenance.

4 Before using

Before starting the Sigma HF make sure the door is closed. Start the machine by turning the red power switch on front of the safety guarding. The color of the stack light flashes blue. After starting the software on the desktop the stack light changes to white which means the machine is referenced and ready to load.

4.1 (Un)loading

Request the machine to open the door by pressing the open button. During this request this button flashes blue. The door is released to open when the button remains blue.

When the door is open, the machine is in standby mode and blocked. A sample can be placed and the door can be closed. The door should be locked with the close button, otherwise the machine isn't released. If the close button remains white, the Sigma is ready to use and perform a test.

4.2 Emergency switch

Stop the machine by pressing the red emergency switch. The stack light on top of the machine flashes red. The test is stopped and the machine is switched off automatically. By turning the emergency switch clockwise and press the 

button in the software, the Sigma restarts and the stack light changes to white. The Sigma HF is ready to use. Only reactivate the tester after making absolutely sure it is safe to do so.

5 Start the software

Before starting the Sigma software make sure the Core Sigma tester is powered on and connected. The software can be used without a tester, but functionality will be limited. Xyztec also offers a simulator software that can be used to simulate the Sigma tester. If the simulator software is running the Sigma software will not detect the connected Sigma tester. Make sure to close the simulator software before starting the software if the real tester is required.

To start up the software just double click on the Sigma icon on the desktop.

Figure 7: Sigma shortcut

If this icon is not available you can start the Windows Explorer and browse to the directory where the Sigma is installed. By default this is the directory **C:\Program Files\Xyztec\ Sigma** or **C:\Program Files (x86)\Xyztec\ Sigma** on a 64 bit operating system. Look for the file xyz_sigma.exe. To create a shortcut to this program just right click on the file and select Send to. In the submenu select Desktop (create shortcut).

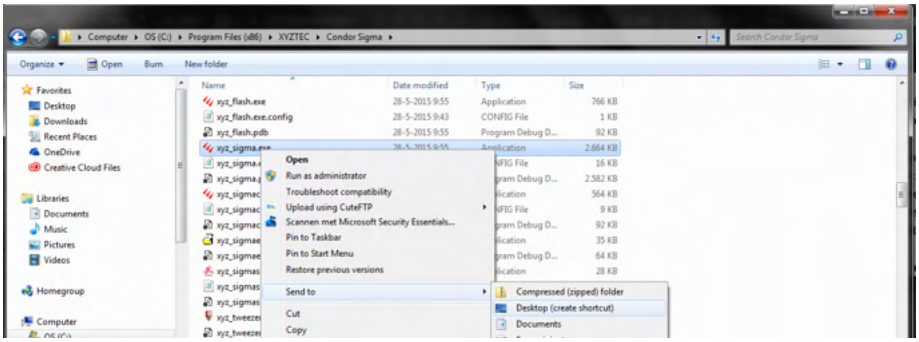


Figure 8: Create a shortcut for the Sigma software

You can also double click the file name to just run the program without making a shortcut. Depending on the Windows version it is also possible to use the options Pin to Taskbar to pin the application to the taskbar or Pin to Start Menu to pin the application to the start menu. This also makes it easy to start the application quickly.

Figure 9: Sigma application pinned to the task bar

6 The screen layout of the Sigma software

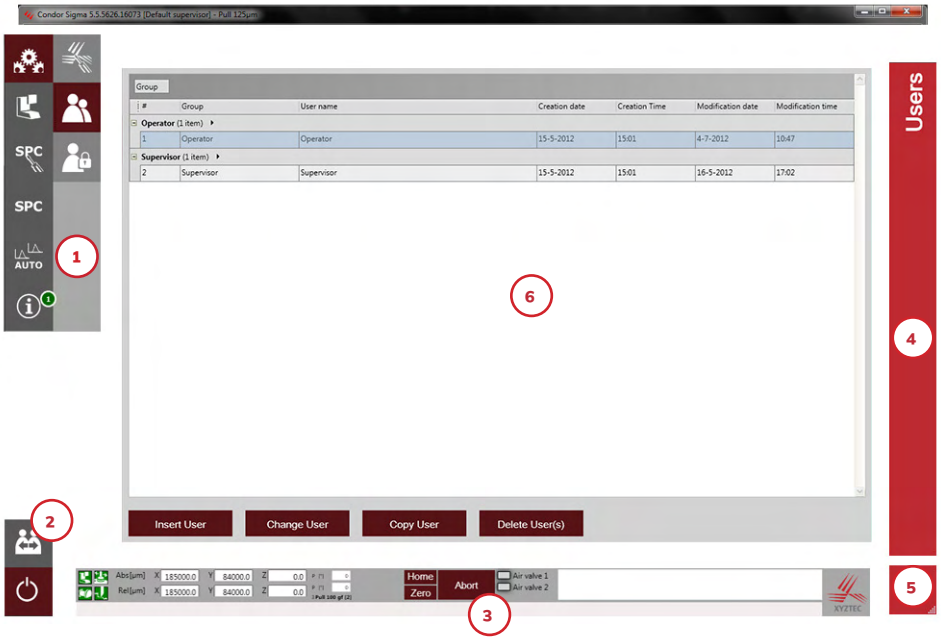


Figure 10: Screen layout with indication of layout areas

The picture shown above shows the screen layout for the Sigma software. Six areas on this picture have a number and a coulored rectangle shows the boundaries for these areas.

- Area 1: Main menu structure. The main menu is actually a vertical bar with tiles. Depending on the selected tile a submenu can be shown. This is also a vertical bar directly to the right side of the main menu. The selected tile is coulored red The available options are shown as grey tiles. The icons will be explained in the next chapter.
- Area 2: Control tiles. Two options are available. The upper tile opens the login dialog. This can be used to switch from the current user to a different available user. The lowest tile shuts down the software.
- Area 3: Status bar. The status bar shows information about the tester, the current positions for the stages, the live measurement graph and currently selected sensor.
- Area 4: Vertical info bar. This bar shows the currently selected menu option. In the figure above this is the users screen. The vertical text will change if a different main or sub menu option is selected.
- Area 5: Resize area. The arrow on the lower right corner can be used to resize the Window if it is not maximized. The minimum size of the Window is 1400 x 850 pixels.
- Area 6: Active screen area. This shows the screen that belongs to the currently selected menu option.

The Sigma software uses tool tips to help you understand the available icons and controls. If the mouse cursor is over an active area and the mouse is not moved for a few seconds a tool tip will pop up. The text in the tool tip gives the operator information about the specific icon or control.

The title bar also displays information about the software, the currently logged in user and the currently used test method.

The Sigma software is designed for a wide screen monitor with a resolution of 1400x900 or more. Using this software on a standard monitor or a monitor with a lower resolution will make certain screen areas difficult to reach.

7 Main menu and sub menu structure

For the Sigma software Xyztec has chosen a menu interface that uses tiles and icons. This chapter explains the different icons and also explains how to navigate the main menu. The main menu is the most left vertical bar with icons. Below is a picture of the main menu:

General settings:	Software settings, users and authorizations
Tester settings:	Tester setup, measurement unit setup, calibration and GR&R
SPC settings:	Result codes and groups, methods, forms and Assignment
SPC:	Test screen, query screen
Automation:	Automation selection and editor
Information:	Information and messages

The selected option has a dark red background colour. Depending on the selected option a submenu may be shown if the specific choice also offers additional options. In the submenu the selected option is also displayed with a dark red background. For all tiles in the main menu and the sub menu's tooltips are available.

Below is the sub menu for the general settings and a short explanation of each option:

Software:	General software settings for the Sigma software
Users:	Manage the users for the Sigma software
User groups:	Manage the available user groups that set the authorisations

If the Tester settings option in the main menu is selected a different submenu is shown. Below is a picture from this submenu and a short explanation of each option:

Tester:	Set the tester settings, joysticks and the stages
Measurement unit:	Setup the measurement unit and sensor settings
Calibration:	Sensor calibration
GR&R	GR&R screen with SPC

When the SPC settings are selected a submenu with the options listed below is shown:

	Result codes:	Result code groups and result codes for grading a measurement
	Methods:	Manage the test methods
	Forms:	Manage the forms for a new sample
	Assignment:	Assign a method and form to a sensor

When SPC is selected the following options are available:

	SPC:	Test screen with SPC
	Query:	Query screen with SPC

When Automation is selected only one option is available.

	Edit automation	Automation selection and editing

When Information is selected the following options are available:

	Tester info:	Information about the tester, software etc.
	Messages:	Warning and error messages

With the tool tips and by remembering the icons for the different options navigating through the Sigma software is easy.

The Information menu button in the main menu can also show a small green or red circle with a number. This indicates if there are any warnings (green circle) or errors (red circle). Check the messages area to find out more. In the messages screen a **Resolve** button after a messages can be used to resolve a warning or error, if possible. Resolving errors can only be performed if the currently logged in user has at least supervisor or engineer rights. An operator cannot resolve any messages.

Figure 11: Messages from the Sigma software

8 Working with a data grid

In the Sigma software data is sometimes shown in the form of a data grid. The data grid is comparable with a table, but offers a lot more and nicer features. We will demonstrate these features in the Methods screen.

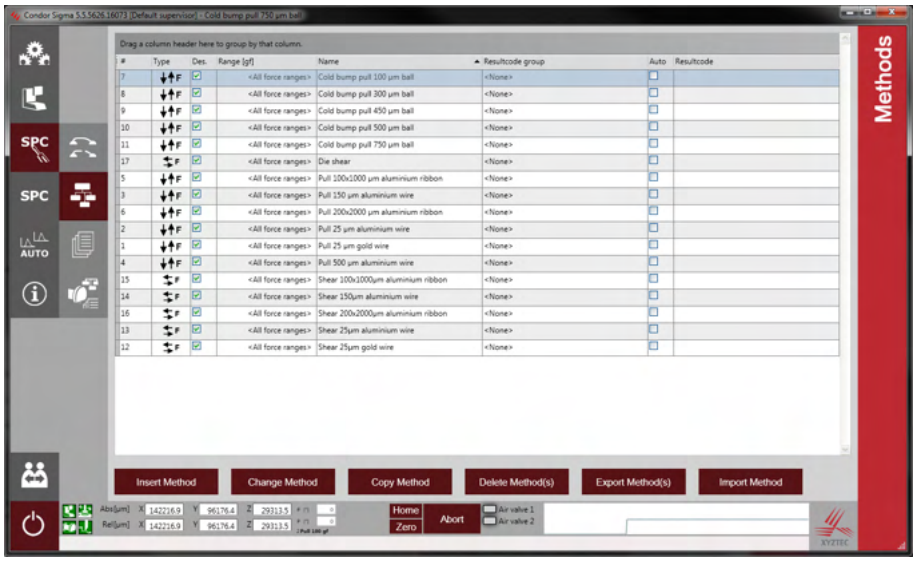


Figure 12: Data grid with available methods

The picture above shows the Methods screen. The large table area on the screen shows a list of all available methods. In the beginning when using our Sigma software this will be a list you can easily oversee. After a while a lot of methods can make the overview more difficult. The data grid can help you by sorting, grouping (multiple columns and nesting supported) and filtering. This chapter shows how to get the most of the data grid.

The first nice feature of the data grid is sorting data. Sorting data is very easy. Just click on the column header (not the arrow besides the header) to sort the data in ascending order for this specific column. Click again on the same column header to sort the data in descending order. A third click will fall back to the default of an unsorted dataset.

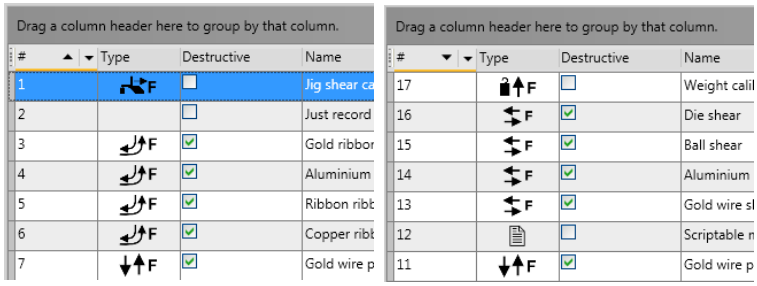


Figure 13: Ascending and descending sort on the method number (#) column

In the data grid it is only possible to sort the data on one column. It is however still possible to sort on multiple columns by using the grouping options for data.

Grouping data on a specific column is very easy. Just left click on the column header, keep the mouse button pressed and drag the header to the grouping area. Then release the left mouse button to drop the column header. The grouping area can be recognized on the text “Drag a column header here to group by that column” or the text “Drag column here”.

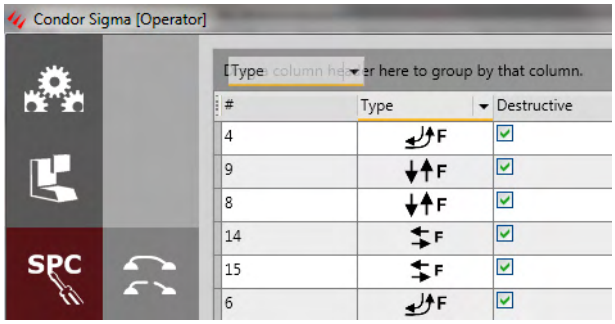


Figure 14: Grouping the methods on method type

The figure shown above shows the drag and drop of the column Type to the grouping area. After dropping the column the methods will be grouped on the method type. All pull methods, peel methods, shear methods etc. will be grouped together as shown below.

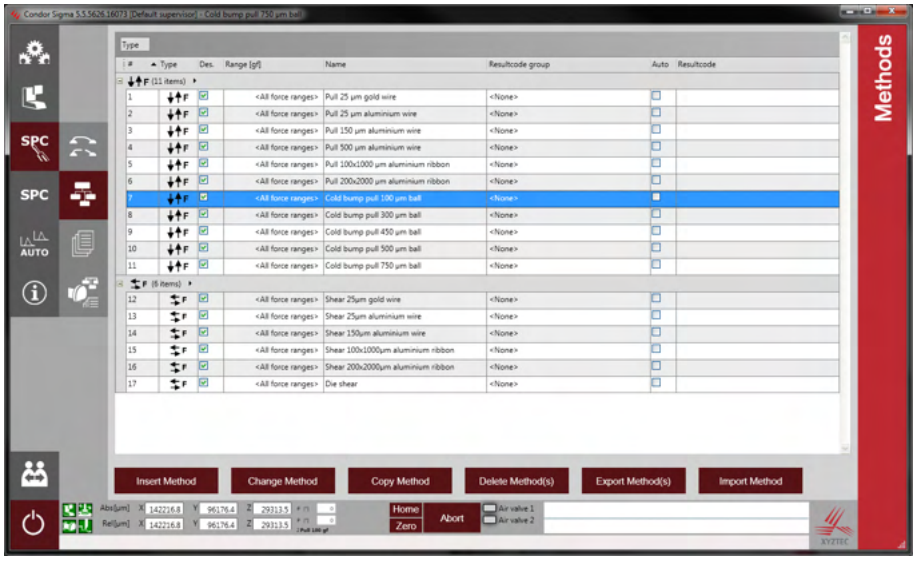


Figure 15: Methods grouped on type of method

It is also possible to group on multiple levels. If we would also drag and drop the Destructive column the methods would be grouped on method type first and then on if the method is destructive or not. This way all destructive pull methods are grouped together. Even when the data is grouped you can still choose to sort on a specific column to make it more easy to find a method or get a better overview.

Each group gets a header that shows the group contents and the number of items in the group. When a lot of data is available it is also possible to use groups for a faster navigation. Just click on the arrow besides the method content and select the group that is needed.

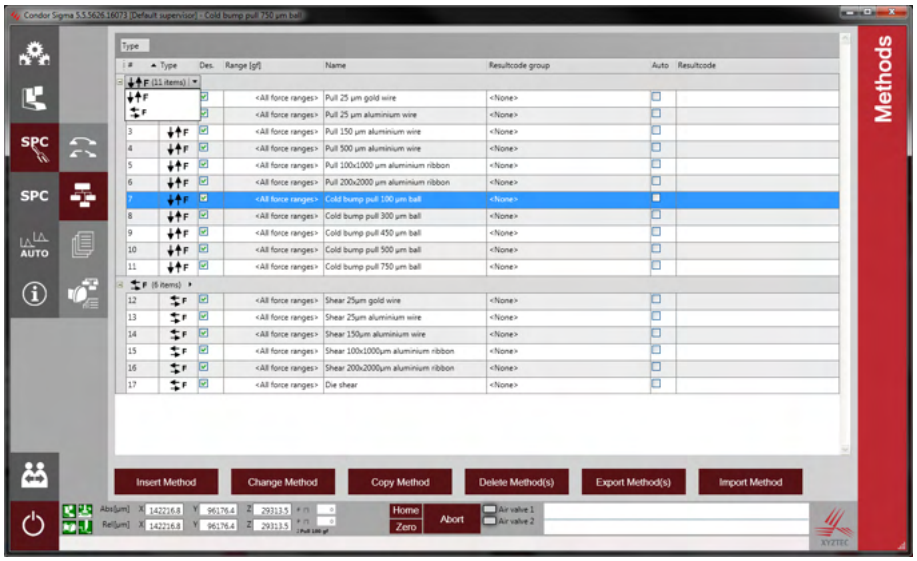


Figure 16: Navigating the methods by selecting a group (type).

Last but not least the data grid also offers an easy way to filter the data. Filtering the data works in a similar way as the filtering used in the more popular spread sheets.

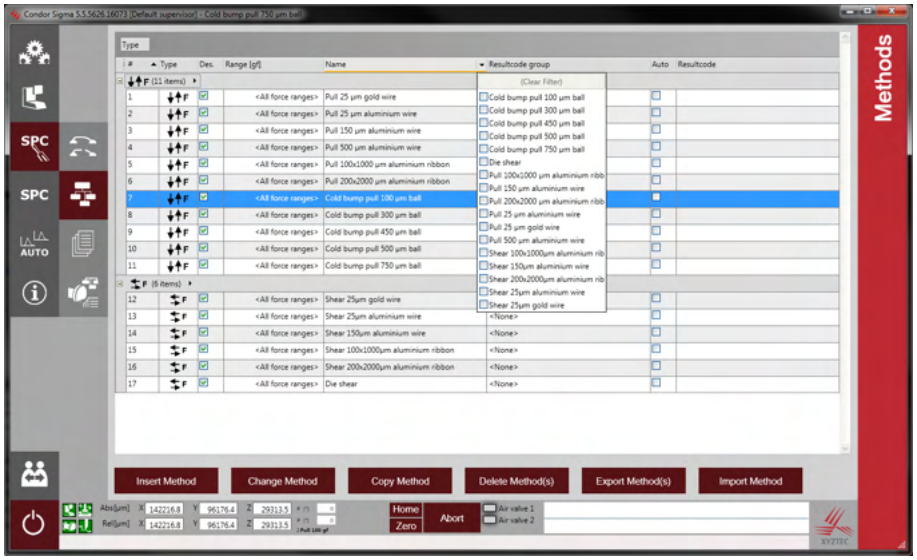


Figure 17: Filtering on the method name

The example in the picture above shows how to filter on the method name (Name). Move the mouse cursor over the column header. An arrow is shown on the right side of the header. Just click on this arrow. A list of all column values is shown. This is a unique list. If a specific value is checked (click on the check box in front of the name) this item will be part of the filtered data. You can check multiple items. The data grid immediately shows the filtered data. After filtering on specific items the column will show a filter icon. To remove a filter just click on the arrow/filter and click Clear filter or uncheck the checked items. The Sigma software contains multiple nested filters. Filtering is especially useful in the query screen.

9 Users

Click software settings and then users in the main menu. The picture below shows the selected menu options. The users screen shows all available users in a data grid. Just as explained in the chapter before you can sort the data, group the data or use a filter.

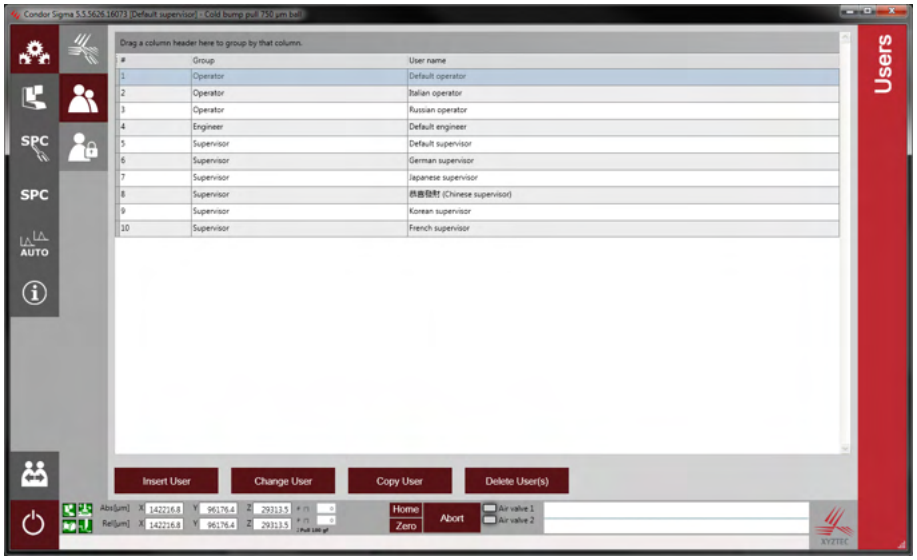


Figure 18: Users screen

Below the data grid the buttons **Insert User**, **Change User**, **Copy User** and **Delete User(s)** are available. If a user is selected and **Change User** is clicked the window below will open. The **User name** should identify the user with an unique name. The **User group** determines the authorisations.

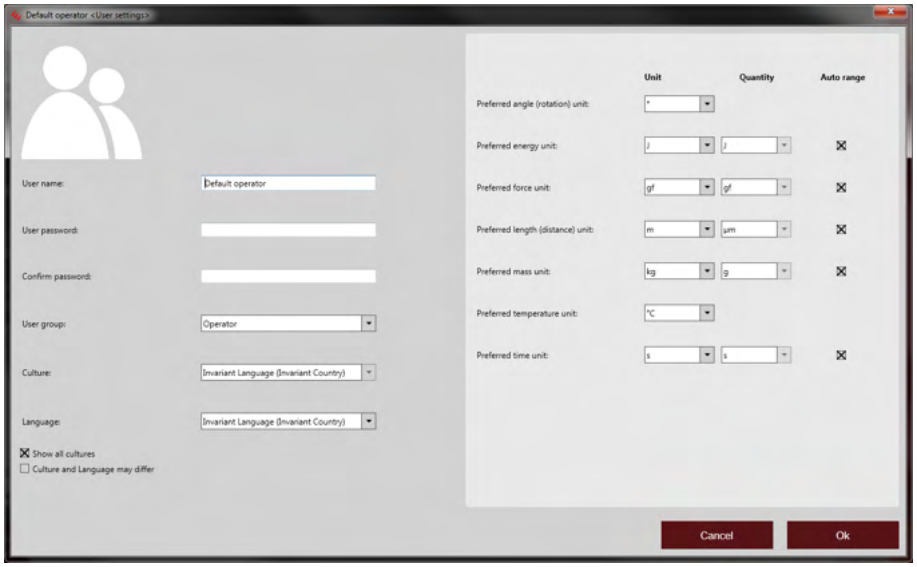


Figure 19: User settings screen

The user settings can be used to change the preferred unit, the settings for the culture or language and the user group (authorisations). The culture settings are used to determine the way numerical data or date/time is shown. The default **Culture** is **Invariant language/Invariant coun try**. Numerical data uses a decimal point. Date and time use the format month/day/year. Make sure to choose the correct setting for your country.

The **Language** setting can be used to set the language for the Sigma software.

If **Show all cultures** is checked the list of cultures and languages is the same as Windows offers. If this is not checked the list will only show the cultures that also offer a translation.

In most cases the option **Culture and language may differ** can be unchecked. In some cases, for example a German user that likes to get the English language, but the German culture settings (decimal comma), it is necessary to check this option. If checked it is possible to select a different settings for the language and the culture.

The unit settings can be used to arrange the setting the **Preferred angle unit**, **Preferred energy unit, Preferred force unit, Preferred length (distance) unit**, **Preferred mass unit**, **Preferred temperature unit** and **Preferred time unit**. The unit angle offers a choice between **degree** (default) and radial (**rad**). For energy the only choice is joule (**J**). Force offers a choice between Newton (**N**) and gram force (**gf**). Length offers a choice between the metric system (**m**) or inches (**inch**). The unit for the mass is **kg**. This setting is used when entering a weight in calibration mode. For temperature we offer decrees Celsius (**degreesC**, default), Kelvin (**K**) and Fahrenheit (**degreesF**). Time only offers a choice for seconds (**s**).

The **Auto range** setting automatically selects a specific unit quantity when a value is in a specific scope. If enabled for the force the system will automatically show kgf if the selected sensor has a force range above 1000 gf..

10 Result codes and result code groups

After a test is performed in most cases the operator will need to visually check the result and determine a grading or failure code. For a pull test for example after pulling the wire the operator will need to visually determine if the wire broke, or if the bond (wedge or ball) broke. Other situations like a neck break or heel break are also possible. The Sigma software offers an easy to use way to define the available result codes and result code groups.

Setting up result codes and groups is a job for the engineer. If setup correctly the operators can work efficiently and make less mistakes when they perform a grading. Click SPC settings and then Result code groups in the main menu. The picture below shows the selected menu options.

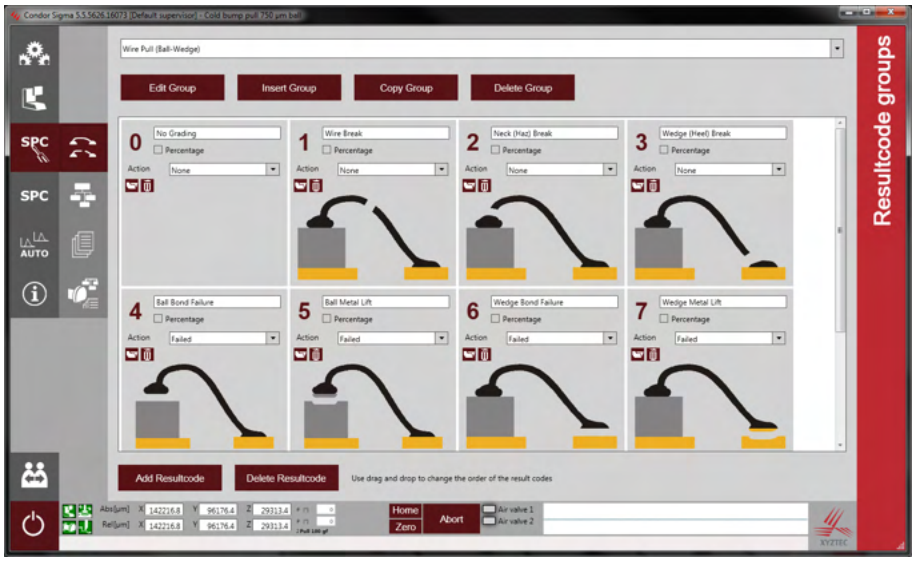


Figure 20: Resultcode groups and resultcodes

A default set of result code groups and result codes are available, including helpful pictures that clearly show when to choose a specific resultcode. In the upper part of the screen you select a result code group. By default the Wire pull (Ball-Wedge) result code group is selected. With the **Edit group** button the name of the selected group can be changed. **Insert group** will insert a new group. **Copy group** will copy a group, including all available resultcodes. **Delete group** will delete the selected group.

The lower part shows tiles. Each tile contains a result code. Each result code shows a **Number**, a **Name**, a checkbox to enable a grading **Percentage**, the resultcode **Action** for the selected code and a **Picture** for the result code. The number can be a number from 0 to 9. The number corresponds with a keyboard key that can be used to quickly select the result code when a grading is performed. The name of the result code is important. It should clearly describe the kind of grading to make it more easy for the operator to understand. If **Percentage** is checked after performing the grading the operator also needs to select a percentage from 0 to 100.

The percentage setting is mostly used for (total) ball shear testing to describe as a percentage how much of sheared area is ductile or brittle. The operator can make an estimate and store this with the measurement.

Restult code actions can be used to perform a certain **Action** when this specific grading is chosen. Below is a list of the possible result code actions:

Fail The measurement result should always be considered a fail, even if the result is within the fail limits.

Disable The measurement result is disabled. The result is still available, but not taken into account when calculating the statistics.

Reject The measurement should not be stored (is rejected). If for example the test is not performed correctly due to an operator error a result code with the result code action reject can be used to not store the result.

Remark When a result code with the remark action is selected the operator needs to type in a remark after performing the grading.

The result code picture can help the operator to select the correct code. By default schematic pictures are used, but photos are also supported. To help the operator make a good choice the picture must clearly show the situation after a test. The operator can then compare the result with the picture and make a good choice..

To add or change a **Picture** just click on the button with the open folder icon. Then select a picture. The picture will be copied to a special folder that contains all result code pictures and the name for the picture is changed to RCOD_xxxxxx_yyyyyy..zzz, where xxxxxx is the result code group number, yyyyyy is the result code number and zzz is the extension (wmf, jpg gif, png or bmp are supported).

To change a result code is very easy. Just click on the part that needs to be changed (the name, percentage, action or picture) and change the current setting. All changes are stored immediately. With **Insert Resultcode** a new code is inserted. **Delete Resultcode** removes the currently selected code.

11 Test methods and method settings

After defining the result code groups and result codes it is time to see how to define or change the method settings. In this chapter we will look into the method screen and see how to change the method settings. To open the methods screen go to SPC Settings and then click the Methods button. The below picture shows the selections in the main menu.

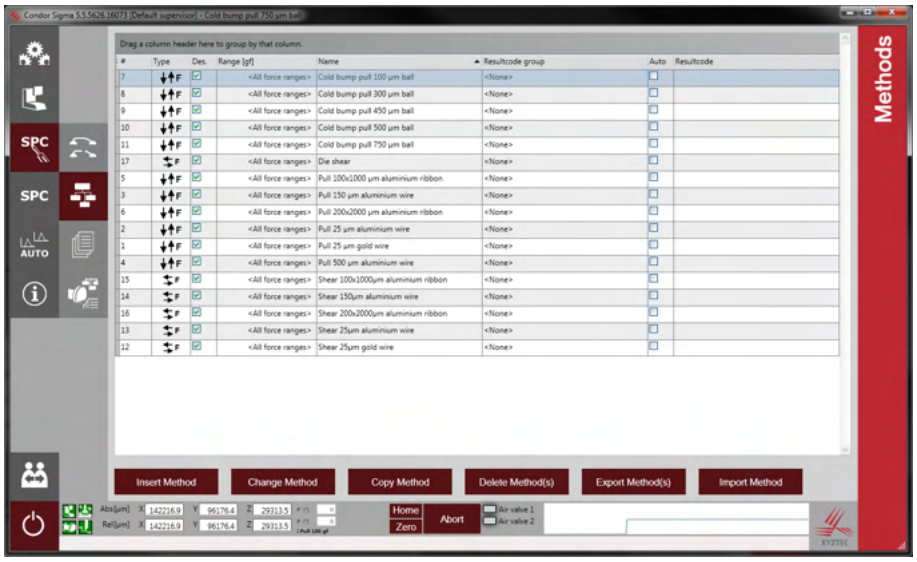


Figure 21: Methods screen with a list of all available methods

The Xyztec Sigma software by default offers a selection of predefined methods. With **Insert Method** a new method can be added. **Change Method** will open the method settings screen for the currently selected method. **Copy Method** copies the selected method to a new method and opens the method settings. **Delete Method(s)** will delete the selected method(s). **Export Method(s)** will export the method settings in one or multiple XML files. **Import Method** can be used to import these XML files. The Sigma software supports multiple method types. For example the pull test and the shear test. Each type of method is identified with an icon. Below is an overview of these icons and the kind of test they belong to.

F	Pull test or push test
F	Shear test
F	Peel test
F	Calibration method to lift a weight with a pull sensor
F	Jig calibration method for a shear sensor

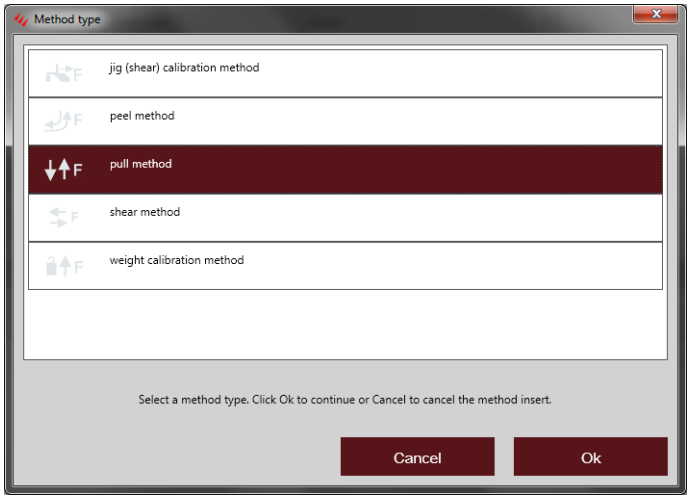


Figure 22: Insert a new method

If the **Insert Method** button is clicked the dialog window shown above is opened. Select a method type and then click **Ok** to continue or **Cancel** to cancel creating the method. Each method type shows the icon for the type and a short description. After the **Ok** button is clicked a window will open with the settings for this specific method. In the first example the pull method is selected before clicking **Ok**.

11.1 Method settings for a pull method

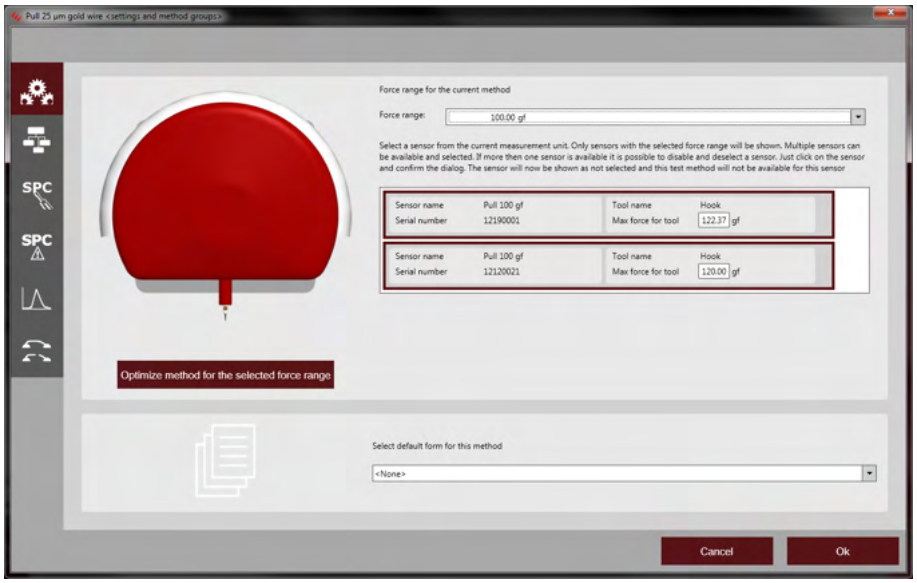
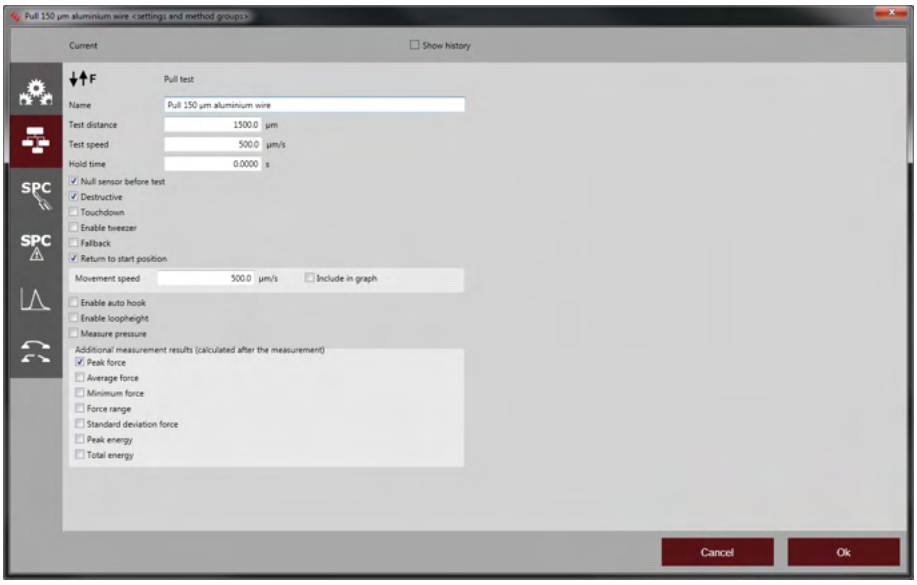


Figure 23: Pull method settings, selecting the force range

The first tab shows the general method settings. It is important to determine the force range that is required. In the example above the 100 gf force range is selected. There are two 100 gf pull sensors available on this system. If the button **Optimize method for selected force range** is clicked the software will automatically set some method values based on the selected force range. It is also possible to force a specific form when the method is selected.

On the left side is a vertical menu with six choices. The first choice ( ) are the general settings, next the method settings ( ) , the SPC settings ( ), SPC warnings ( ), measurement graph settings ( ) and the last choice ( ) the settings for the grading. By default the first choice is selected and the general settings are shown.



Click the icon for the method settings. The window with the method settings will now show the settings for a pull test.

On the first line the icon and method type are shown. In this case the pull test icon and the text **Pull test.** Once a method is created it is not possible to change the method type! The **Name** for the method should be an easy to recognize name that clearly describes the kind of test or sample that is going to be tested. Aluminium wire pull test is for example a good description. Aluminium wire pull test 150 µm would even be a better description. If the name clearly describes the purpose it will be easier to find the right method.

The **Test distance** is the distance that the system will move the Z-stage to perform the test. A positive distance will start a movement up (pull test). A negative distance a movement down (push test). Make sure the test distance is sufficient to pull the wire.

Test speed sets the speed during the test. The best test speed is determined by the required units per hour and the required accuracy.

Hold time can be used to wait after the test. This setting can be used in two cases. Case 1: If the operator needs more time to check the grading the hold time can help. Case 2: During a non destructive test the pre-set limit force will be applied for the pre-set hold time.

Null sensor before test is checked by default. The sensor is automatically nulled before a test. In some very rare cases this setting needs to be disabled. For example when a preload is already applied to the sensor when the test is started, but this preload still needs to be part of the measurement.

Most pull tests are by default destructive test. The goal of the test is to break the tested wire or part. To perform a destructive test the box in front of **Destructive** must be checked. To perform a non destructive test the box must be unchecked. When **Destructive** is unchecked the **Force limit** must be set. This should be the force the tested part should be able to withstand during the test.

The **Fallback** in the Sigma software can be used to optimize the number of tests per hour. In a lot of cases the customer is interested in the force graph until the peak has been reached and a small distance after the peak. The rest of the graph does not add real value. Since less distance is moved the total test time is shorter and when many tests are performed this setting will increase the number of tests per hour. If this is important the **Fallback** should be checked..

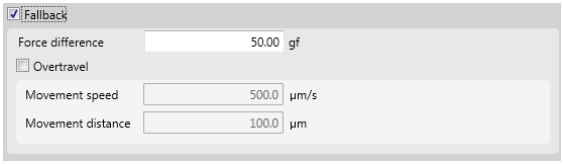


Figure 24: Fallback enabled (checked)

If fallback is enabled a **Force difference** needs to be set. When the force drops more than the force difference the software will stop the test. Check **Overtravel** to enable the overtravel feature. This makes it possible to move further in the test direction for the set **Movement distance** with the set **Movement speed**. In most cases the movement distance is relatively short. This setting can sometimes help to remove the pulled wire from the hook. It also adds a little bit of additional data to the measurement graph.

By default the box in front of **Return to start position** is checked. After the test has finished the stages will move back to the start position. In most cases this is exactly what is needed. In some cases however we may not want to move back. Uncheck the box in those cases. If the box is checked the **Movement speed** for the move to the start position can be set. If the box in front of **Include in graph** is checked the movement to the start position is also recorded as part of the force graph. By default this option is not checked and the move back is not part of the graph.

If the box in front of **Enable autohook** is checked the auto hooking feature is used. By default when a wire pull test is performed the operator manually needs to move under the wire before starting the test. With auto hooking a lower limit needs to be set in the test screen before a test is started. The hook can be positioned **Along the wire** or **Across the wire**.

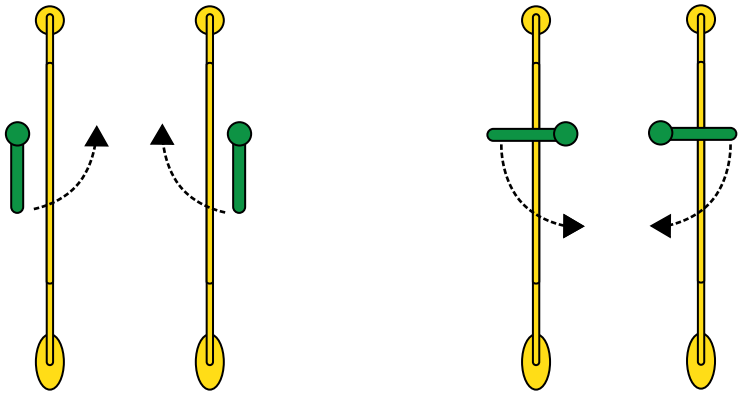


Figure 25: Auto hook rotation and position, pictures 1 to 4 (from left to right)

Along the wire means that the hook is aligned with the wire. Figure 18 picture 1 and 2 show this situation. It is important that the hook can rotate under the wire. If the box in front of **Lower limit** is checked the stage will first move to the lower limit. The rotation point of the hook should be on a safe distance from the wire where the hook can still rotate under the wire after moving down. If **Lower Limit** is not checked the lower limit is not used and the hook will rotate on the current position. Make sure to have a starting position on the correct height to safely rotate the hook under the wire. If the wires are on different heights unchecking the **Lower Limit** makes it easier for the operator to perform the test. In most cases the lower limit is used.

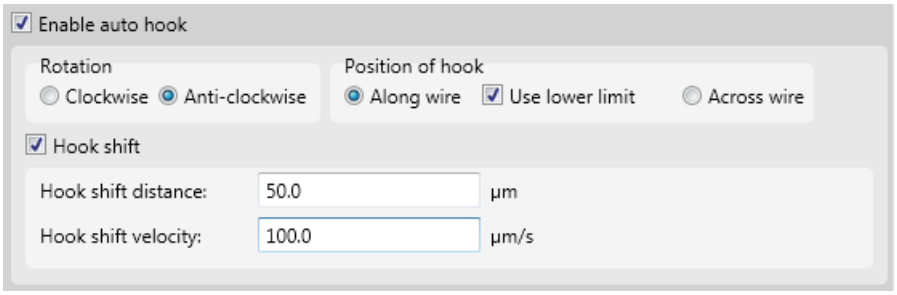


Figure 26: Auto hook settings

Picture 3 and 4 on the right side show the hook **Across the wire**. The hook is perpendicular to the wire. The rotation point of the hook should also be on a safe distance from the wire, in such a way that the hook will rotate under the wire after moving down. With this setting using the lower limit is required. The advantage of across the wire is that it is easier to see how the hook is positioned. Disadvantage is the additional rotation. Please note that when the hook is to close to the wire and the test is non-destructive, it is possible that the wires is stretched and after the test the hook lands on the wire. Make sure to keep a certain distance.

A **Clockwise** rotation is shown in picture 2 and 4. A **Anti-Clockwise** or counter clockwise rotation is shown in picture 1 and 3.

Auto hook is especially a good feature when a lot of parallel wires are tested. It is still important to get the right position, but it is not necessary to manually move between the wires and rotate under the wire.

An additional feature is the so called hook shift. This feature helps to shift the hook further under the wire and reduces the change of missing the wire. Check **Hook shift** to enable this feature. The **Hook shift distance** set the distance the hook is shifted under the wire. In most cases this is a relatively small distance. The **Hook shift velocity** sets the speed for this move.

It is also possible to combine a pull test with a loopheight measurement. In this case the system will perform a touchdown on the surface and then move up and try to detect the wire with a relatively low force. After this the pull test is performed. The Sigma software can remember the touchdown, to make the test more efficient. It is also possible to detect a touchdown on a different location, when it is not an option to land when positioned under the wire.

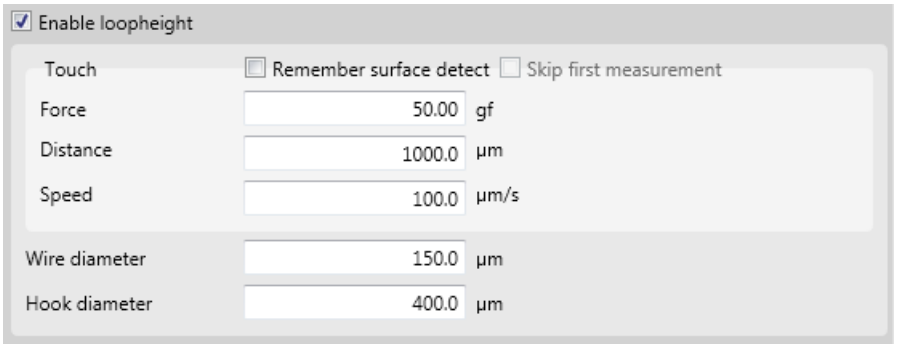


Figure 27: Loopheight settings

The settings under **Touch** are used for the surface- and wire detection. **Remember surface detect** is used to remember the z-height for the surface detection. For the next test the surface detection is skipped. If **Remember surface detect** is checked the option **Skip first measurement** becomes available. If this option is checked the system will only detect the surface and not perform a wire detection or the test. The software will show that the measurement is not stored. The next measurement the wire detection and the pull test are performed. The loopheight is calculated with the z-height from the surface detection. For the surface detection the **Force** determines the landing force. The **Distance** is the maximum

distance the software will search for the surface or the wire. The **Speed** sets the speed for surface detection. Depending on the current sensor it is important to set the force to a low value (for example 5 gf for a 100 gf sensor) and also use a low speed (for example 100 µm/s) to reduce the impact to the surface.

To calculate the correct loopheight it is also important to set the correct **Wire diameter** and the correct **Hook diameter.** Since the lower part of the hook is used for the surface detection and the upper part is used for the wire detection the hook diameter has to be added to the measured distance. If the top of the wire is defined as the loopheight the wire diameter also needs to be added. If the lower part of the wire is defined as the loopheight the wire diameter should be set to 0.0 µm.

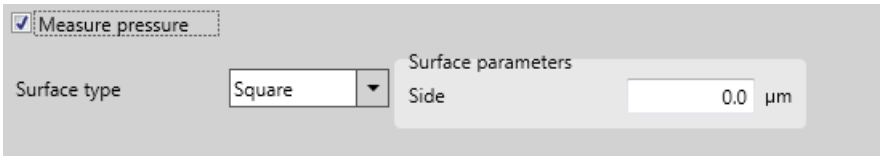


Figure 28: Settings for measurement of pressure

When the area of contact is known it is possible to calculate the applied pressure. To set this result check **Measure pressure**. Select the Surface type (square, circle, rectangle) and set the **Side** for a square, the **Diameter** for a circle and **Width** and **Height** for a rectangle. The software will use these settings to calculate the correct pressure for a specific applied force.

The Sigma software can get multiple results from one measurement. By default the Peak force is the result. It is also possible to get the **Average force**, **Minimum force**, **Force range**, **Standard deviation force**, **Peak energy** and **Total energy**. Since these results are calculated from the measurement graph they are called **Additional measurements (calculated after the measurement)**. Just check the required measurement results.

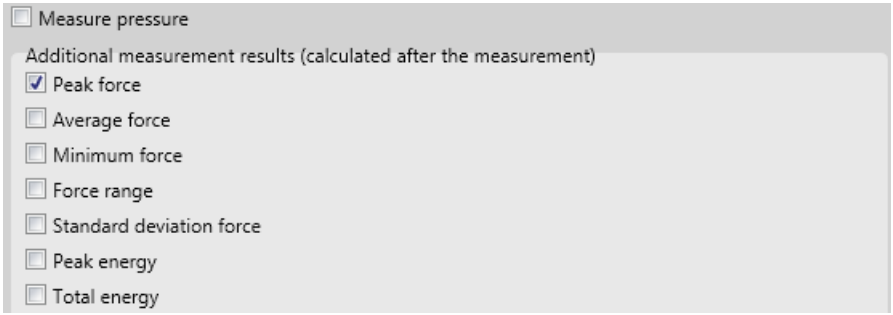


Figure 29: Additional measurement results

The average force is determined by totalling all the forces for each measurement samples in the measurement graph and dividing this by the number of measurement samples in the graph. By default all measurement samples are used. For the peak force (highest force) this is not a problem in most cases.

The software also offers to set a region of interest under the measurement graph settings. With the region of interest it is possible to only include measurements above or below a certain force. .

For pull tests with a tweezer a sensor with tweezer is required. Check **Enable tweezer** to see the tweezer settings.

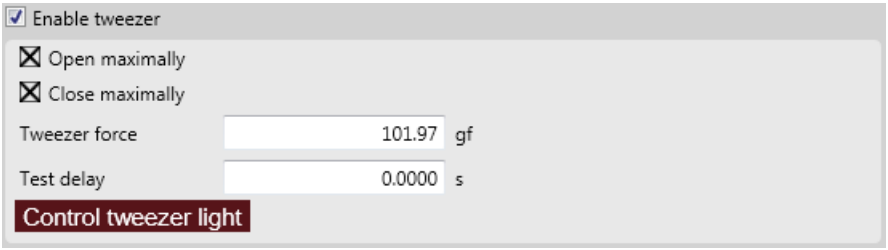


Figure 30: Tweezer settings

By default **Open maximally** and **Close maximally** are checked. In some cases it is not possible to open the tweezer completely without hitting obstructions. In that case uncheck the Open maximally setting and set the **Opening distance**. In the same way it is also possible to limit the **Closing distance** by disabling **Close maximally**. The **Tweezer force** sets the gripping force for the tweezer. To make sure the pull test does not start before the tweezers have gripped the part the **Test delay** needs to be set.

For cold bump pull testing it is also important to check **Touchdown**. This enables a surface detection before trying to grip the bump. For this touchdown only the **Force**, **Distance** and **Speed** can be set.

11.2 Method settings for a shear method

If in the Methods screen the **Insert Method** button is pressed and the method type **Shear test** is chosen the method settings will look different. Below is a picture with the settings for a shear test.

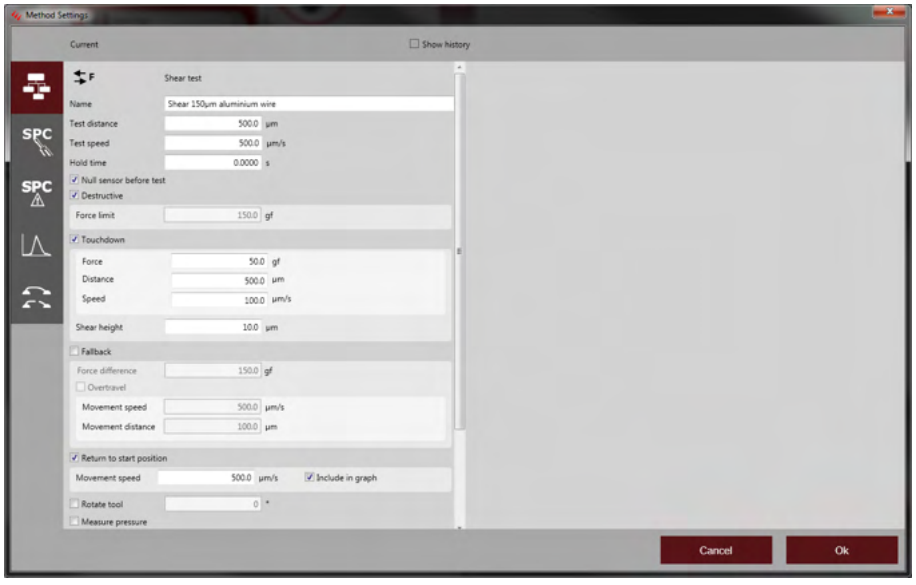


Figure 31: Method settings for a shear test

The first line shows the icon for a shear test and the text **Shear test**. The **Name** can be used to give the method a name. As stated before make sure that the name describes the method in such a way that it is easy for the operator to recognize what the method does.

Test distance is the movement distance. For a shear test this is a movement in Y direction. A positive distance shears away from the operator, a negative distance shears towards the operator.

Test speed is the movement speed during the test.

Hold time is the time the system waits after performing the test. For a non-destructive test the force will still be applied on the part.

Null sensor before test is checked by default. The sensor is automatically nulled before a test. In some very rare cases this setting needs to be disabled. For example when a preload is already applied to the sensor when the test is started, but this preload still needs to be part of the measurement.

The box in front of **Destructive** is by default checked. The test is performed as a destructive test. If this settings is unchecked a non-destructive test will be performed. In that case the **Force limit** needs to be set.

The box in front of **Touchdown** is by default also checked. For a shear test a touchdown is important to make sure the system has a reproducible shear height. During the touchdown the stage will move down until the shear tool touches the surface with the preset **Force**. During the touchdown the system will move down with the pre-set **Speed** for the pre-set **Distance** until the force is detected. If the surface is not detected during this distance the test will abort and an error message will be shown.

After surface detection the Z-stage will move up for the pre-set **Shear height**. In most cases the shear height is a relatively small distance. When the shear height has been reached the test will start.

For the fallback please check the fallback settings for a pull test. For a shear test a larger overtravel can be helpful to remove debris away from the test area.

After the test and optional fallback the system by default returns to the start position. Uncheck **Return to start position** if this is not needed. If this option is checked you can change the **Movement speed** and choose to include the movement to the start position in the graph by checking **Include in graph**.

For a rotating shear sensor it is also possible to pre-set a specific rotation hook. By default the system will move in the rotation direction of the tool. In most cases this is perfect. In some cases it is better to set a specific rotation. Check **Rotate tool** and set the rotation angle.

The settings for additional results are also similar to the pull test.

11.3 Peel method

For pull sensors the Sigma software also supports a peel test. During a peel test the X- and Z stage or the Y and Z stage move the pre-set test distance with the same test speed. Because two stages move at the same time this generates a peeling effect. In most cases a peel test is performed with a tweezer.

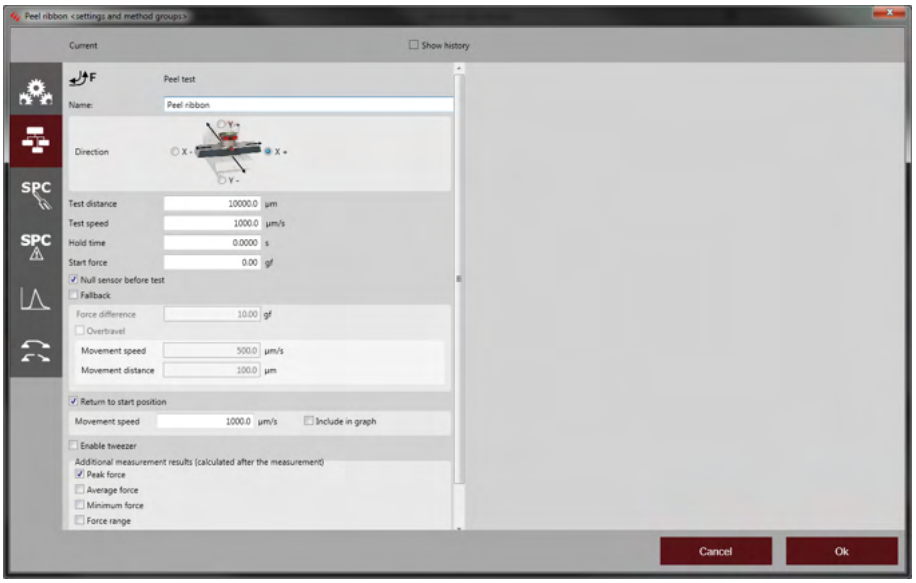


Figure 32: Peel test settings

The first setting sets the **Direction** for the peel test. It is possible to select the X stage in positive (X +) or negative (X -) direction. The same is possible for the Y stage. The **Test distance** is the distance both the Z stage and the selected stage will move. The **Test speed** sets the speed during the test. The **Start force** can be used to first generate a pre-set preload. The system will only move the Z stage until the start force is reached. After this both the set stage and the z-stage will move the pre-set distance.

Null sensor before test is checked by default. The sensor is automatically nulled before a test. In some very rare cases this setting needs to be disabled. For example when a preload is already applied to the sensor when the test is started, but this preload still needs to be part of the measurement.

The fallback settings are similar to the pull test. Fallback is almost never used during peel testing. **Return to start position** is useful. This is also similar to the pull test. **Enable tweezer** enabled the tweezer. For most peel tests a tweezer is required. The tweezer settings are also the same as for the pull test.

For the peel test only the peak force may not be enough. In many cases the measurement graph will show multiple peaks and troughs. The peak force would then be the force shown in the highest peak. This is often not enough to qualify the test result. For peel testing the average force may be a better qualification. Also the total energy is used often. Make sure to check all the required test results required for qualification.

11.4 Loopheight method

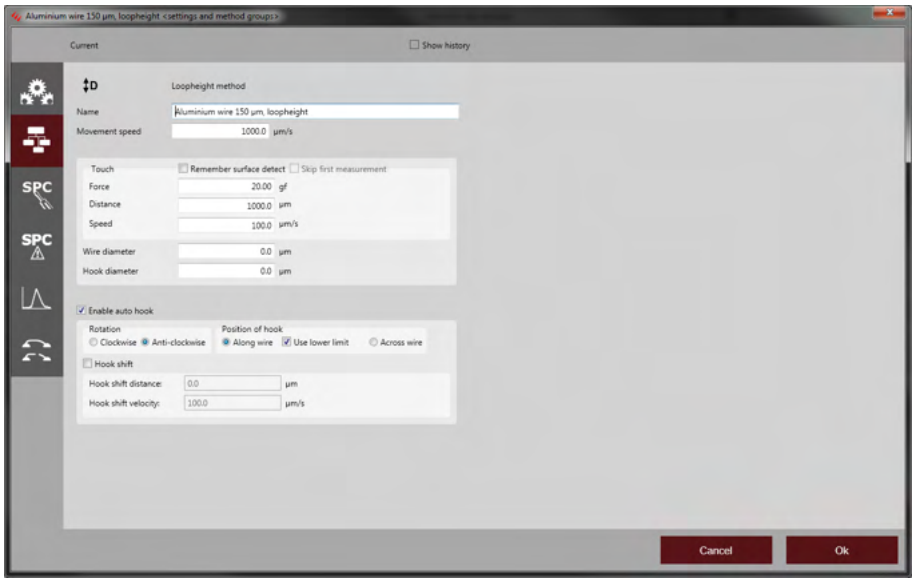


Figure 33: Loopheight method settings

The loopheight method can be used to only determine the loopheight, without performing a pull test. The settings are the same as the loopheight settings for a pull test. The test result is the measured distance. The wire diameter and hook diameter will be added to the measured distance.

11.5 Probe method

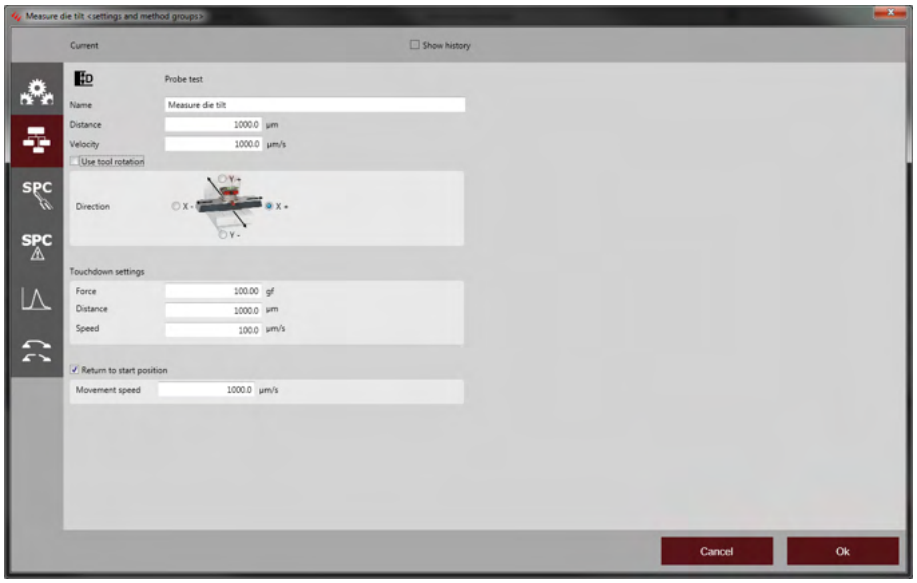


Figure 34: Probe test settings

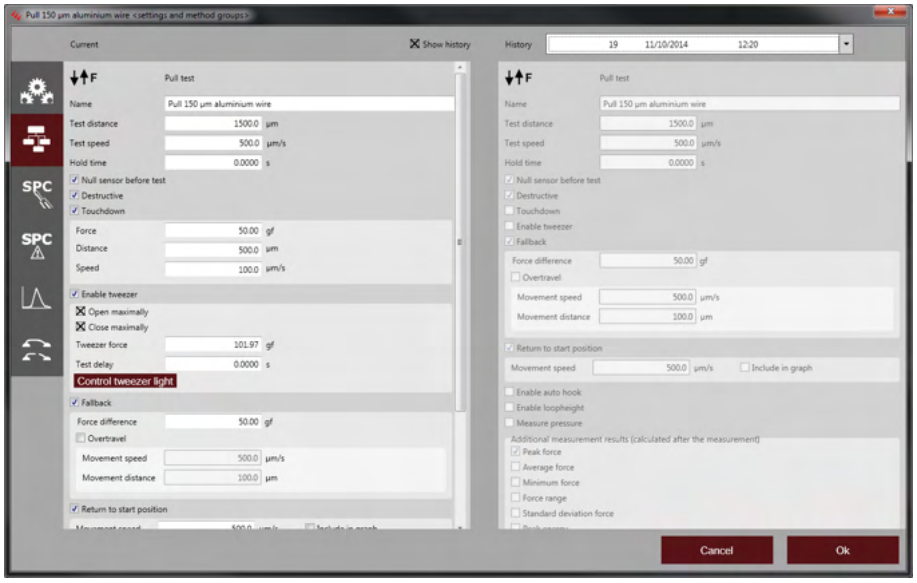
A probe test is a different kind of distance measurement. A touchdown is performed on a specific position. A specific distance is moved in a pre-set direction. Another touchdown is performed. The distance between the surface z-height is calculated and is the test result for this test. The touchdown settings are the same as for the pull- and shear method. The **Distance** sets the movement distance, the **Velocity** sets the speed to move this distance.

If **Use tool rotation** is checked the system will move in the direction of the tool. If this option is not checked a setting for the **Direction**, similar to the peel test becomes available. Select a positive X direction (X +), or negative X direction (X -), or a positive Y direction (Y +) or a negative Y direction (Y -). The system will use this setting to determine where the stages need to move before performing the second surface detection.

The **Return to start position** is also available and works the same way as with the other tests..

11.6 Method history

When a method has been stored and is opened again for further editing you can see the history of the method settings on the right side. This way the software keeps track of the changes in the method. The upper right side shows all the history for the current method. If you change any settings and click the **Ok** button these settings are stored as the current method settings and the latest history and the previous settings can be found under the previous history. This list shows a history number, the modification date and the modification time. When a test is performed a reference is stored to the latest history.



The advantage of this system is that it is always possible to see the exact settings that have been used for a specific test. Especially when a test method has just been created the method settings may be changed a few times, before the setting is correct. The history makes sure it is still possible to track the changes and even see if specific settings give better results.

11.7 SPC results

The third menu choice in the vertical menu are the SPC result settings. When this menu choice a clicked the screen below will open.

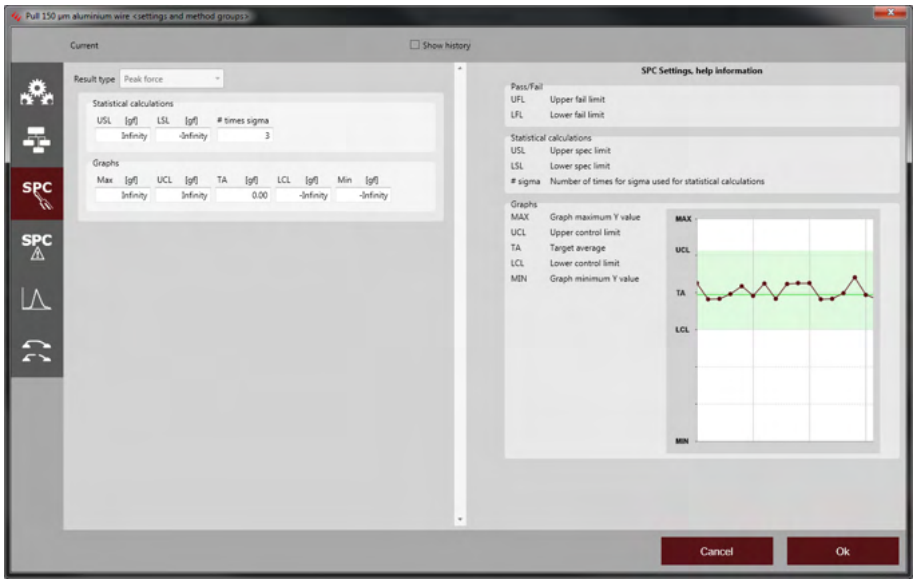


Figure 35: SPC result settings

Every test method can have one or multiple results. For the standard pull and shear test currently only the **Peak force** is offered as the result. Depending on the settings for measuring pressure, loopheight and the additional measurement results more settings may be available..

The **Result type** shows the current type of result. This type cannot be changed.

The **Spec limits** are used for the calculation of the Cpk. It is important to set a correct lower (**LSL**) and upper spec limit (**USL**) to get a valid Cpk value. When set to +/- Infinity the value is not used and the Cpk is not calculated.

The **# of times sigma** setting is by default set to 3. The control limits in this case are the average minus 3 * sigma and the average plus 3 * sigma. If **# of times sigma** is set to 4 the calculation becomes the average plus or minus 4 * sigma.

For the graphs settings are available for the maximum (**Max**), upper control limit (**UCL**), target average (**TA**), lower control limit (**LCL**) and minimum (**Min**).

The information on the right side of the SPC result settings also explains all these settings and show the graph settings in action. In most cases the method is created first and a few tests are performed. The results are used to optimize the SPC result settings. When a lot of experience is available for specific tests the settings can be done immediately. If these settings are adjusted the test screen or the graphs will immediately reflect the changes.

11.8 SPC Warnings

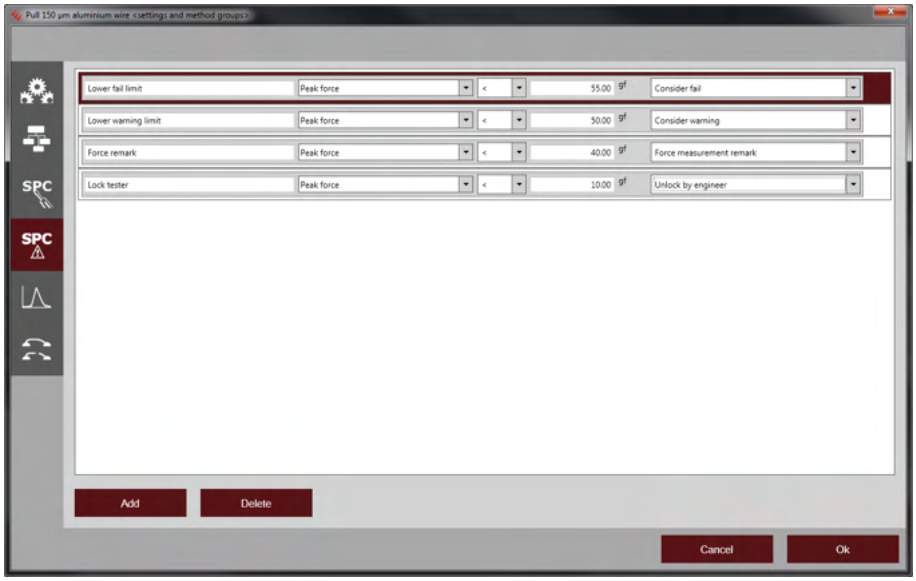


Figure 36: SPC warnings for a test

In the previous software versions the SPC results also offered a setting for the lower fail limit and the upper fail limit. This setting has been removed from the SPC results and is now available as a more flexible option under the SPC warnings. Under SPC warnings a new warning can be added by clicking the **Add** button. Give the warning a meaningful name (like lower fail limit or fail for the fail limit). Select the test result. Any available test result can be chosen. Select if the force is smaller (**<**), or smaller or equal (**<=**), or larger (**>**) or larger or equal (**>=**). After this set the quantity to compare the test result with. In this case the measured peak force is compared with 55 gf and if smaller than 55 gf the action **Consider fail** is performed. When a measurement result is a failed result the software will show this with a red background. Also in the statistics the number of failed measurements is shown.

The action **Consider warning** only shows an orange background. This is not shown in the statistics. The action **Force remark** forces the operator to enter a measurement remark, to explain why the measurement is below or above the pre-set value. T he option **Lock tester** will show the login screen. Only an engineer can unlock the software now.

11.9 Measurement graph settings

In the method there are also some settings for the measurement graph that can also influence the measurement result. It is possible to set an area of interest for the measurement graph. This area of interest can also have an influence on the measurement result. It is also shown in the measurement graph.

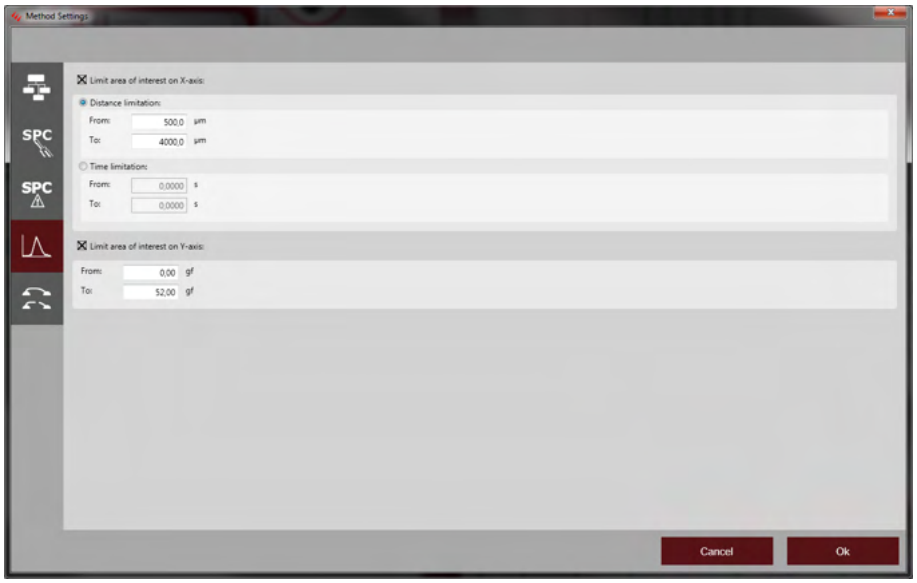


Figure 37: Measurement graph settings

Check **Limit area of interest on X-axis** to set an area of interest for the X axis. Select **Distance limitation** or **Time limitation**. For the distance enter a **From** distance and a **To** distance. For the time enter a **From** time and a **To** time.

Check Limit area of interest on Y-axis to set an area of interest for the Y axis. Set a **From** and **To** value for the force.

In the measurement graph this would look as below picture shows:

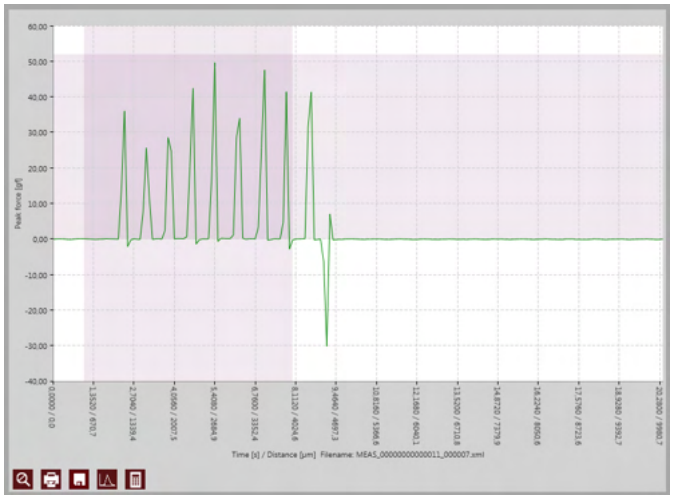


Figure 38: Measurement graph with area of interest.

11.10 Result code group and result codes

The last menu choice in the vertical menu is used to choose the result code group and set a default result code.

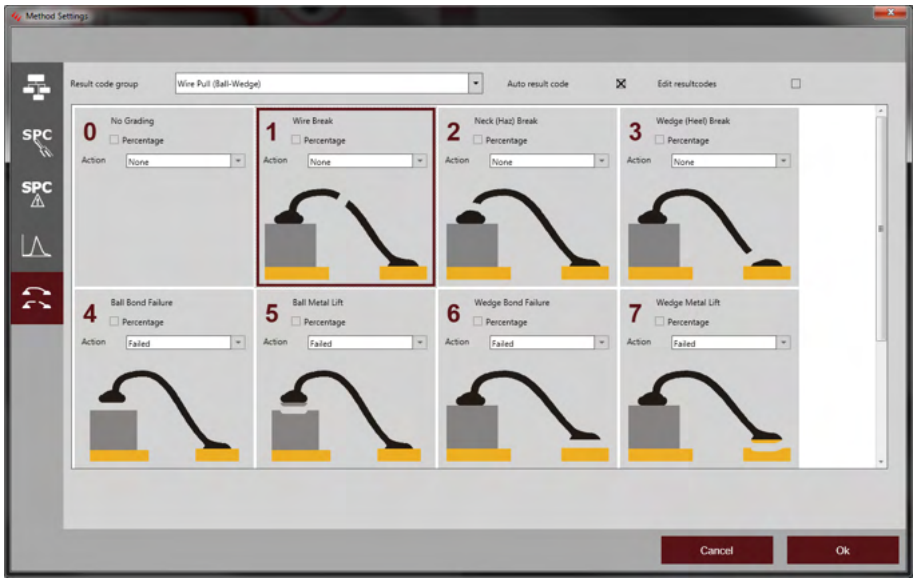


Figure 39: Method grading, auto result code checked and a result code selected

By default the **Result code group** is set to <no result code group selected>. In this case grading is disabled and after a test a grading or failure mode can not be set. If a result code group is selected grading will become available. The lower screen area will show all result codes available.

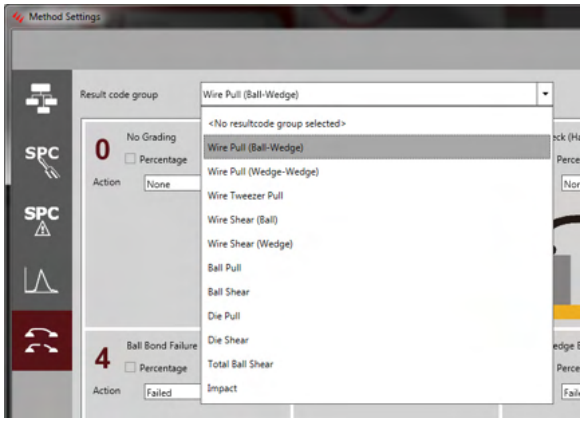


Figure 40: Select a resultcode group

The result code group list will show all available result code groups. It is important to define the resultcode group before trying to use this in a method. If a resultcode group is selected the option **Auto result code** can be checked. It is possible to change a resultcode by checking **Edit resultcodes**. After checking this option the resultcodes can be edited.

If **Auto result code** is checked and a result code is selected (tile with a dark red boundary) the Xyztec Sigma software will automatically use this result code if the measurement is not considered a fail (see the SPC warnings). In the case demonstrated above the software will assume the Wire Break as the default result code. It is still possible to change this afterwards by regrading the measurement.

If **Edit resultcodes** is checked it is possible to change the available resultcodes or even add or delete resultcodes with the **Add Resultcode** button and the **Delete Resultcode** button. If a resultcode was forgotten when the resultcode group was created it is easy to add this. If a resultcode is not correct or needed it can be deleted. Not only the **Name**, **Percentage** or **Action**, but also the image can be changed. It is also possible to use drag and drop to change the order of the result codes.

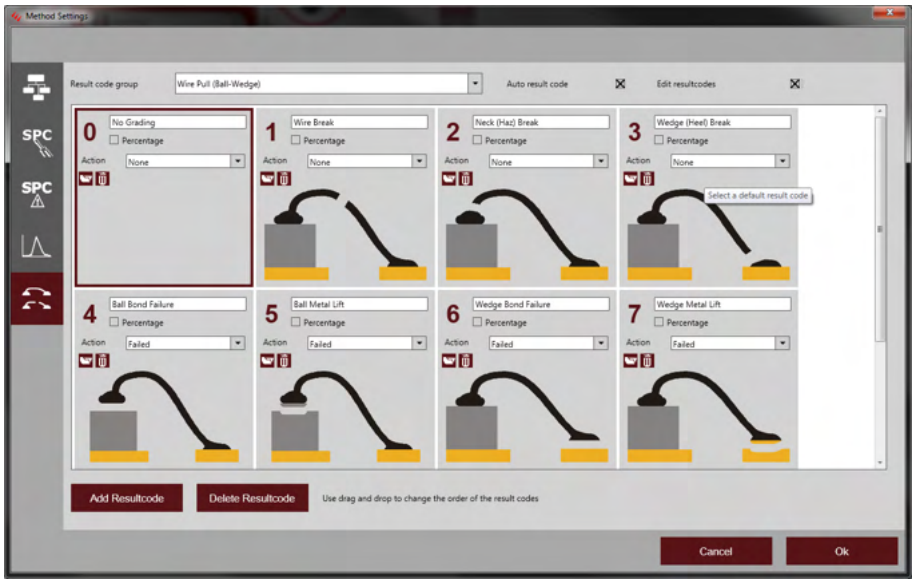


Figure 41: Edit result codes enabled

12 Forms and fields

In the past when bond testers were not controlled by PC software the information for the current sample/measurement was written on a card or form. An engineer created this form and printed it. The operator fills out the important data. For different parts or different tests different forms may be required.

This concept is also used in the Xyztec Sigma software. The engineer can create a form and create fields. These fields can be used on the form. When a new sample is created this form is opened and the operator needs to fill in the required data. This data is stored with the sample and can be used for statistical analysis and look ups. The fields on the form will also be available as columns in the test and the query screen.

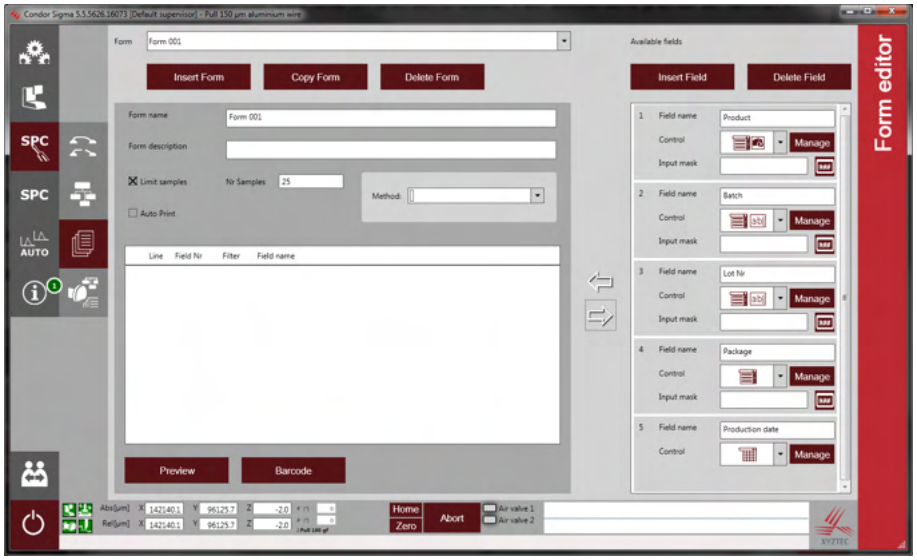


Figure 42: Empty forms and some fields

The upper left side of this screen shows a selection for the form. By default no forms are available. To create a new form click **Insert Form**. To copy an available form click the **Copy Form** button. To delete the selected form click **Delete Form**.

The area below the form selection shows the contents of the form. Each form has a **Form name** and a **Form description**. Every form also offers the setting **Limit samples** to limit the number of samples in the tests screen. If **Limit samples** is checked the **Nr Samples** can be set. **Auto print** will automatically print a pdf file when this number of samples has been created. These pdf files are stored in the C:\Users\Public\Documents\Xyztec\Sigma\AutoPrint directory. The **Method** selection can be used to select a default method when a form is selected. Below this an empty area is available to add the required fields.

The right side of the screen shows the available fields. By default no fields are available. To create a field just click **Insert Field**. To delete the selected field click the **Delete Field** button. The available fields are shown as tiles with all the required data directly available for editing. The first important part of the field is the **Field name**. Use a clear field name so other engineers also understand what the field is used for. The **Control** shows the kind of control that is used on the form. The Xyztec Sigma software offers multiple types of controls.

	Operator can only select the available items.
abl	Operator can select available items or add new items.
	Operator can only select the available items. These items can show a picture to make it easier to recognize the correct choice.

ab|	Operator can only add new items.
	Operator can select a date from a calendar control.

The **Manage** button opens a new screen where the engineer can add or delete field items. Select only items can only be added this way.

The **Input mask** can be used to ensure a predefined format when a new field item is entered. Especially numerical data, date or time needs to be formatted, to make sure that the input is always the same. Using the calendar control also ensures the correct format for a date.

To support the engineer with creating a mask a button is available after the mask. Click the ### button to open the dialog window below.

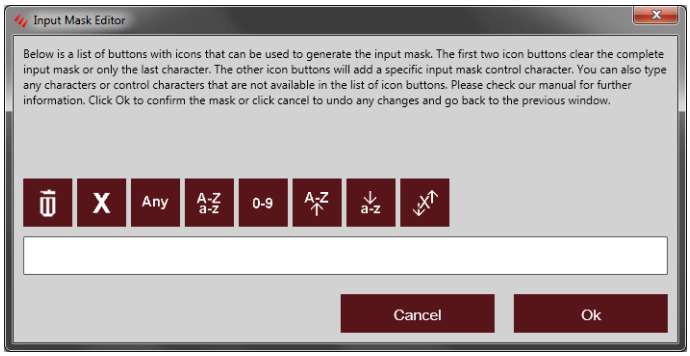


Figure 43: Input mask editor

The input mask editor offers multiple buttons that can help the engineer to create an input mask. Below is a list of all the buttons and their function.

	Clear the complete mask.
X	Clear the last character of the mask.
Any	The character C is added to the mask. Input of a character is needed. This can be any character.
A-Z a-z	The character L is added to the mask. Input of a letter A to Z or a to z is required.
0-9	The character 0 is added to the mask. Input of any number 0-9 is required.
A-Z	The character > is added to the mask. All characters after this character will be converted to upper case.
a-z	The character < is added to the mask. All characters after this character will be converted to lower case.
	The character | is added to the mask. The lower case or upper case function is disabled from this character.

A few examples of a mask:

0000	Input of four numbers (0-9) required. For example 1103 is okay.
0000_LL	Input can be 1234_aa or 1234_AA.
0000_>LL	Input can now only be 1234_AA. If 1234_aa is typed it is converted to 1234_AA.
00:00	Input for time. Input can be 13:30 or 05:59.
00/00/00	Input for data. Input can be 05/01/12.

The mask checks if the input confirms to the mask but does not check if the input is a valid time or date. Xyztec advices to use the calendar control for more control.

When the mask is created click the **Ok** button to confirm or **Cancel** to exit without saving.

12.1 Adding new items or deleting items

Click the **Manage** button for a specific field to add new items or delete available items. This is especially important if the control has been set to a select only list. When a new sample is created the user cannot select any values if these are not already available.

The Manage field items window is opened. On the right side the current field is shown. It is no problem to change the field parameters. The upper left part shows the part where the item can be changed. The lower left part shows all available items. The **Insert** button inserts a new item to the list. The **Delete** button removes the selected item.

Be careful not to delete items that have been used to create a sample. In that case the link to the item will be lost and it may become more difficult to find this sample. The sample will however still be available.

To add a new item click **Insert** and type in the name for the item in the area on the upper left corner. If a mask is used it is possible that certain characters cannot be used for input. If the control with pictures is used it is also possible to select a picture for each item.

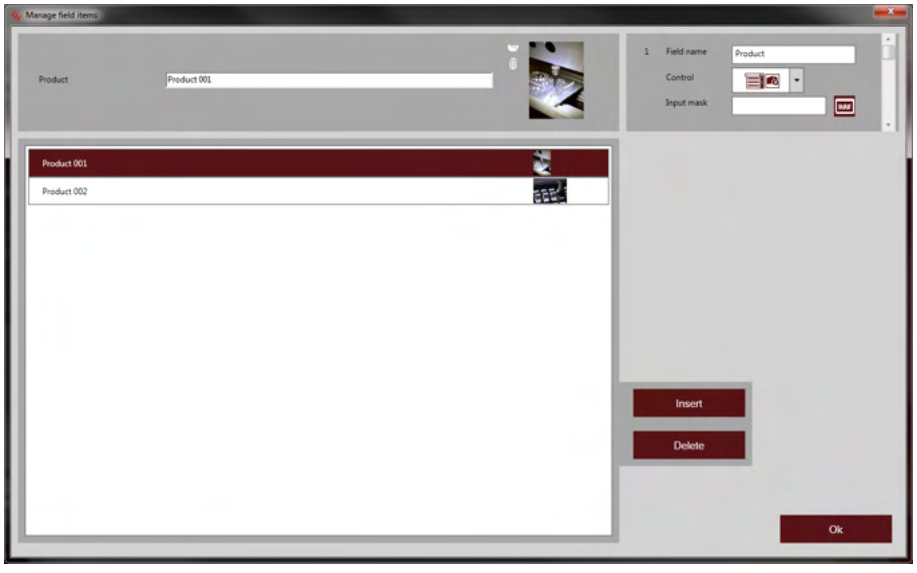


Figure 44: Manage field items with pictures

It is not necessary to go back to the Forms screen to manage the items for a different field. The scroll bar on the upper right corner can be used to change the field to a different field. After this items can be added for this field.

12.2 Add or remove fields from a form

Back in the forms screen the available fields can be added to the form with drag and drop or by clicking the arrows between the form area and the fields area. For drag and drop click with the left mouse button on a field and hold the mouse button while the mouse cursor is moved over the white form area. The mouse cursor will change and the left mouse button can be released to drop the field on the form.

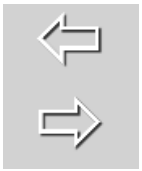


Figure 45: The arrows between the form area and the field area

To use the arrow buttons between the form area and the field area just select a field. Then click the upper arrow that points from the fields area to the form area. To remove a field from the form just select this field on the form and click the lower arrow that points from the form area to the fields area.

A form can hold up to 4294967296 fields and the same number of forms is supported.

12.3 Preview of a form

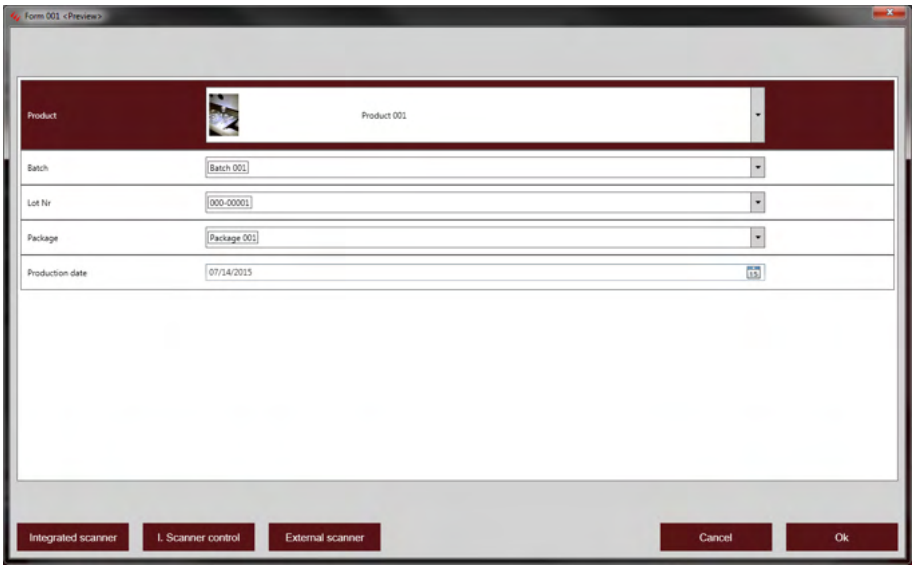


Figure 46: Preview of a form

When the form is finished and all required fields are on the form the **Preview** button can be used to test the form. A window will open with the form preview. For each field the field name is shown and the control. For the Product and the Lot Nr the operator will need to select a value from the list. By default a value is already selected.

If a mask is used the plus button ( )can be used to add a new value. When this button is clicked the new value can be entered. Click the save icon ( ) to save this or click the cancel icon ( ) to cancel adding the new value.

13 Assignment

After defining the test methods and maybe also one or multiple forms the next step is to assign a method and form to each sensor. This way when a different sensor is selected the assigned method will be selected and the assigned form will also be loaded. It is still possible in the test screen to change the Assignment.

To change the Assignment of the method and form go to the **Sensor - Method - Form** screen. Here a measurement unit is shown with on the right side all available sensors. For each sensor a method or form can be chosen.

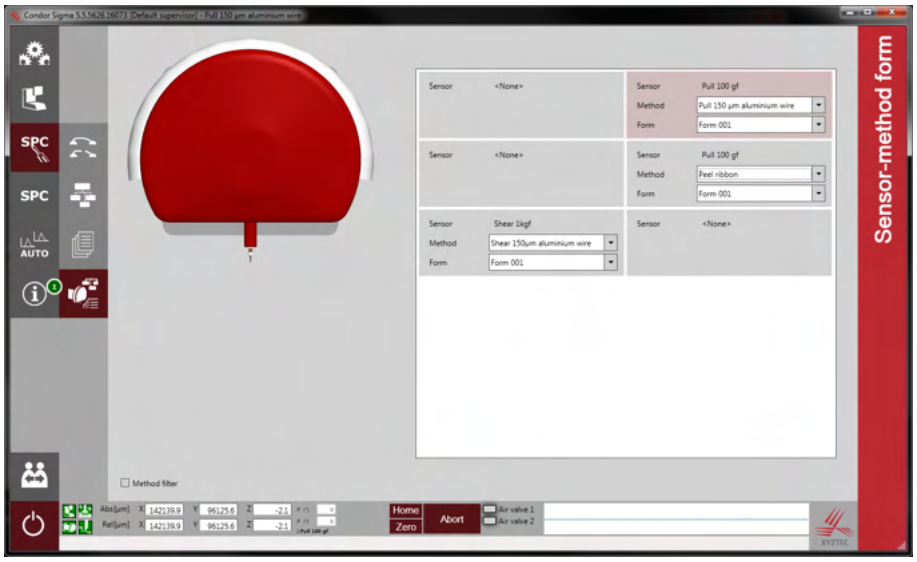


Figure 47: Sensor - Method -Form screen

For each sensor only valid methods can be chosen. For a pull sensor the shear methods will not be available and for a shear sensor the pull methods will not be available. This makes it easier to find the correct sensor. It is required to set a method. If the form is set to <None> no form is used.

The lower left corner offers a **Method filter**. The method filter can help to find a method is a large number of methods are available. If this option is checked the input fields for a sensor offer additional selection choices for the method type, the target (destructive/non-destructive) or the method group. These selection choices influence the number of available method choices and make it easier to find the correct method.

In the latest software versions assignment from a method and form is not the only way. Some customers prefer using the method to select the correct sensor and form. Other customers may prefer to let the form select a method and the method select a sensor.

If the method should select the form and sensor it is important to setup the force range under the method settings and also set the form. Check paragraph 8.1 to set this up correctly.

If the form should select the method and the sensor make sure a sensor is appointed by setting the correct force range (check paragraph 8.1). Also make sure to select a default method in the form (check paragraph 9).

14 Test screen

After setting up all SPC Settings the first tests can be performed. Under SPC the first option in the submenu is the Test screen.

Figure 48: Sigma test screen

The upper left of the test screen shows the measurement unit, surrounded by the control panels with buttons for the left and right joystick. The buttons on the control panels can be used to trigger the same function as the real joystick buttons. The selection box on the measurement unit can be used to select a different sensor, a different method or a different form if the user is authorized to do so.

To change the method settings the method settings button ( ) can be used. The methods settings Window from the previous methods chapter is opened and the changes for the method can be set. It is however not possible to change the force range or the form selection here.

To change the form settings the form button ( ) can be used. The forms window will be opened. In the forms window the form selection is disabled.

The area in the lower left corner shows the available measurements. In the picture above no measurements are available. Since no measurements are available the right side of the screen only shows empty tabs.

To perform a measurement just press the Test button on the joysticks or click the **Test** button on the control panels. Before starting a test however it is important to first check what tool is available on the current sensor and depending on the test change the tool to a different tool. The second step is to check if the work holder can be used to perform the specific test on the current application. If not change the work holder to a more appropriate type and mount the test sample on the work holder. When the work holder and tool are okay the joysticks can be used to position the tool on the correct position to start the test. After this press the test button.

During the test a second press on the **Test** button on the joystick or on the screen will abort the running test. Use this to abort when the test seems to go wrong. Depending on the kind of test and the method settings by most tests a force will be applied and a measurement is made. In most cases the stages will also move back to the start position after the test. During the test the status bar will show the different stages of the test and also show if a problem occurs. When the test is finished without errors the measurement is stored and shown in the list on the lower left side.

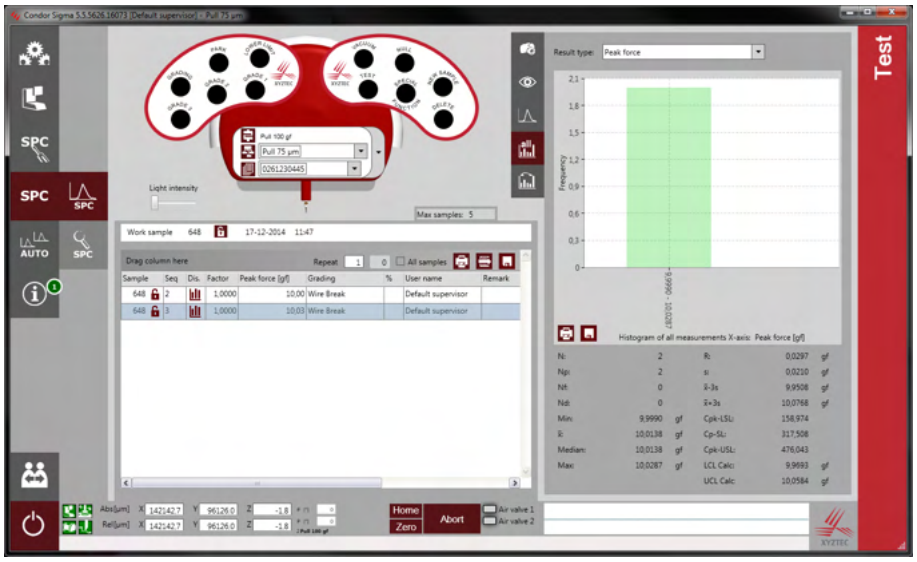


Figure 49: Test screen after performing a test with graph view 2 on the right side

The right area shows a vertical bar with buttons. .By default if **All samples** is unchecked five buttons are available. The first button ( ) opens the camera window. The second button ( ) shows any pictures stored for the selected measurement. The third button ( ) shows the measurement graphs. The fourth button ( ) shows the statistics for all measurements. The fifth button ( ) shows the graphs for the grading statistics. The red coloured button is always the currently active feature. In the screen above the all measurement statistics are shown.

If **All samples** is checked four additional buttons become available. One button ( ) shows the grading and/or group statistics in a table. Another ( ) shows the trend graphs for the available samples. The next button ( ) shows the trend graphs for the current grouping. These are only available if a group is created in the measurement area. This feature will be explained later in this chapter. The last button ( ) shows trend graphs for the averages (x-bar) and the standard deviation.

In the lower left corner the measurement data is shown. The upper area show the currently active and open sample. The button with a lock shows if the sample is open ( ) or closed ( ). If this button is showing the open icon and is clicked the sample will be closed and the button shows the close icon. A sample is closed when the end date and time are set. Below this is the area that is used for grouping the data on a specific column. Click on a column header and drag and drop this in the area indicated with Drag column here. After this the data will be grouped on the values for this column. When a grouping is created the trend graphs for the grouping will also become available.

After performing a lot of measurements and creating multiple samples the test screen may look as below.

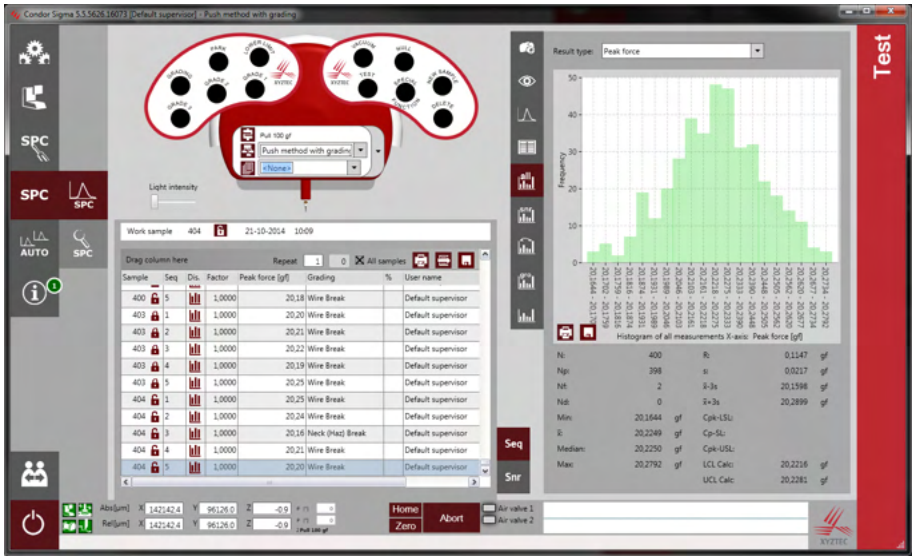


Figure 50: Test screen with many samples and measurements.

Sometimes a test needs to be repeated a pre-set number of times. Change the number after **Repeat** to the number of times the test should be performed. This option can be very helpful when a non-destructive test needs to be performed multiple times on the same part.

The export button ( ) can be used to export all currently shown measurement data to an Excel-, pdf-, Word-, Powerpoint- or csv file. The Print button ( ) can be used to print the measurement data. The Save button ( ) is used to save the layout of the data grid. Just as described in chapter 5 the data grid can be sorted, grouped, filtered and columns can be made visible or hidden. These changes can be stored with this Save button. If no form is set the changes will be for the selected method. If a form is selected these changes will be stored for the specific combination of form and method.

The next page shows some screens with the trend graphs

Figure 51: Test screen with the trend graphs for the samples

If the current method uses a result code group the measurements will be graded and the trend graphs for the grading statistics becomes available.

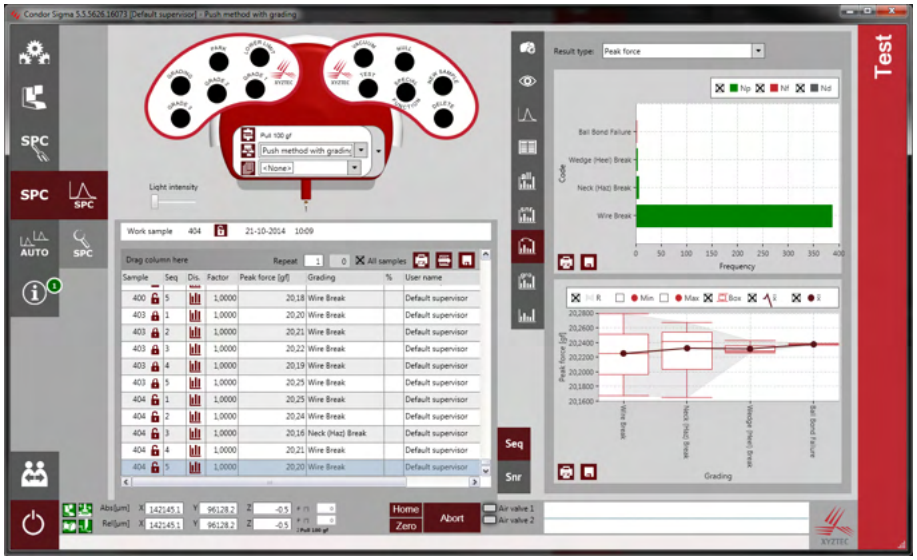


Figure 52: Test screen with grading statistics

The Sigma software can keep track of the statistics for all measurements, the samples, the grading and the group statistics. This makes the software very flexible, but still easy to use. The software will also only keep track of this statistics if it is required.

The next screen shows the group statistics if the measurement data is grouped on the sequence number. To generate this situation click with the left mouse on the **Seq.** header, keep the mouse button pressed and drag this to the

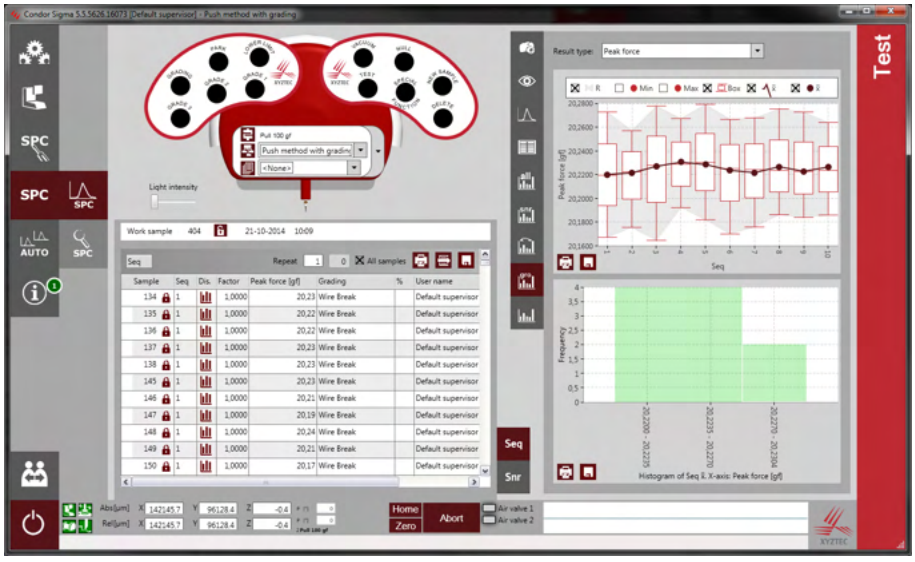


Figure 53: Test screen with group statistics on sequence number

The next step is to perform some tests with a form. Make sure a form is available with the required data. Select this form in the test screen. When a measurement is performed a new sample needs to be created. Because a form is used the below dialog window will open.

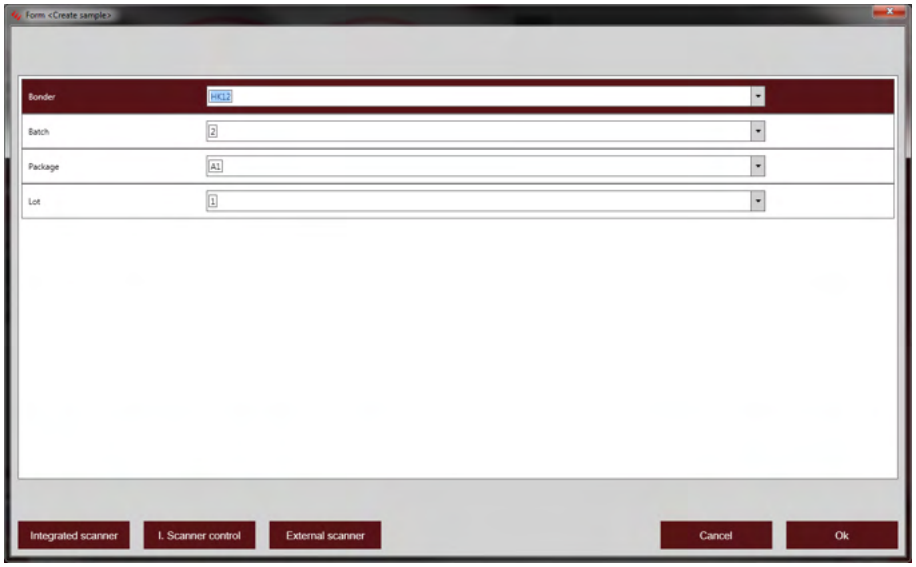


Figure 54: New sample dialog

In this case a bonder, batch, package and lot is selected. The Sigma software also supports using a barcode scanner. Both a special automatic integrated barcode scanner and a standard manual barcode scanner are supported. Please contact Xyztec for more information about this.

The fields Bonder, Batch, Package and Lot will now also be available as columns in the measurement grid. It is now also possible to group on specific data, like for example the bonder. When this option is used the software will show the statistics for each bonder. With sufficient data this gives a very good idea about the bonder performance.

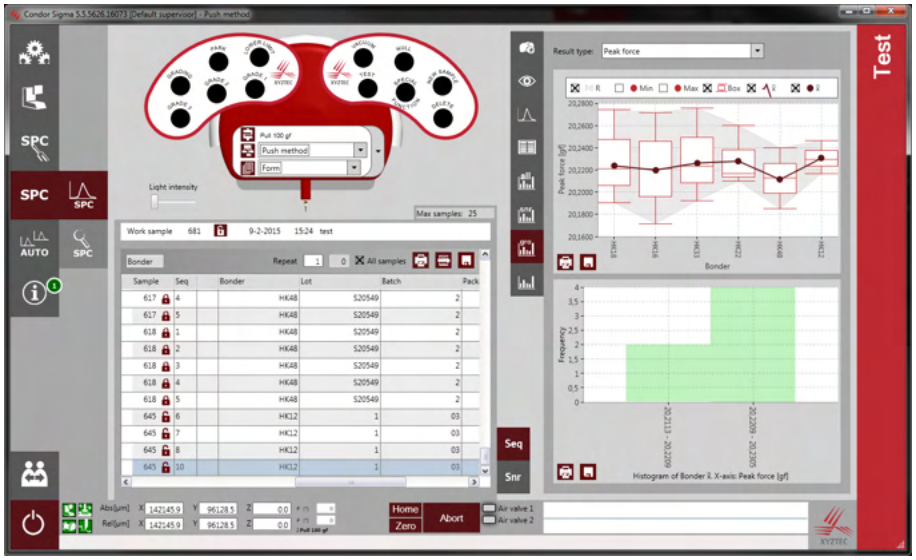


Figure 55: Test screen with a form, trend graphs for the bonder

When a test is performed and the method uses a result code group the grading window will open after a test. All available result codes for the methods result code group are shown. In the lower area the measurement graph and the measurement result including the lower and upper fail limits are shown. If the box in front of **Edit resultcodes** is checked the available codes can be changed.

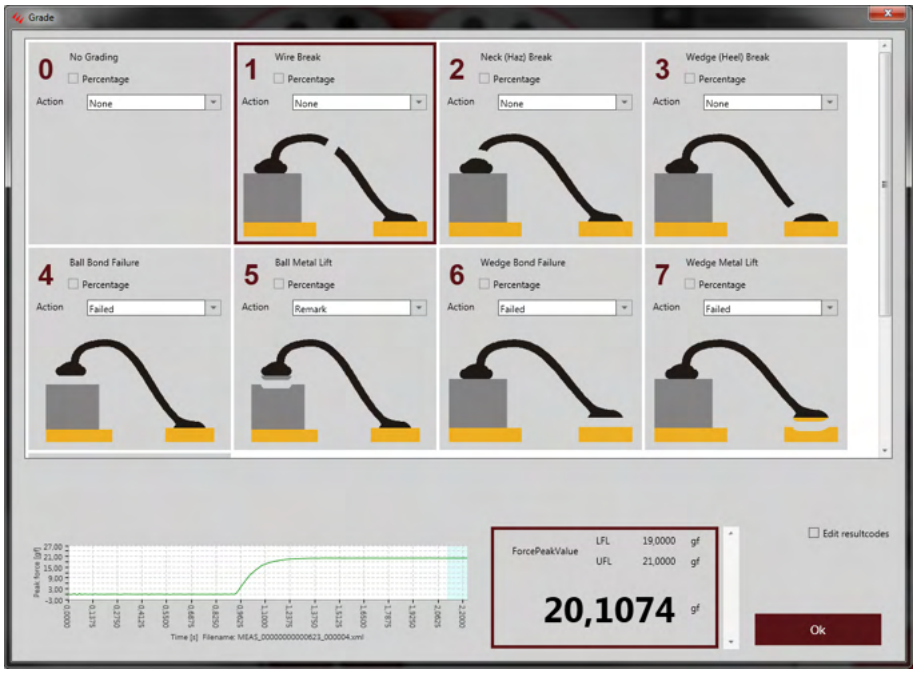


Figure 56: Grading window

To select a grading use the numeric keys 0-9, select the grading with the mouse, or use the **Grade 1**, **Grade 2** or **Grade 3** buttons on the joysticks or the screen. The **Grading** button on the joysticks or the screen changes the selected grading. The **Test** button confirm the selection.

The data grid on the lower left side also offers a popup menu. If the sample is open the menu will offer more options then when the sample is closed.

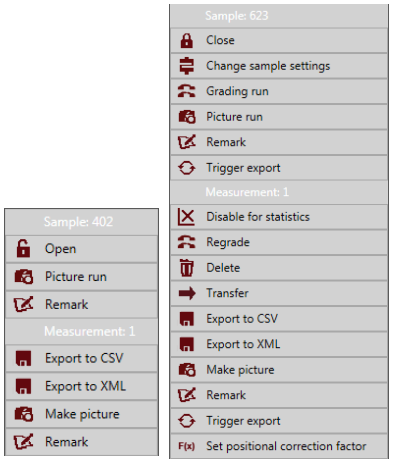


Figure 57: Right click menu for measurements, left is closed sample, right is open sample

The popup menu always show the currently selected sample and the currently selected measurement. The menu options under the sample are sample related. **Open** or **Close** will open or close the sample. If a sample is closed no measurements can be added. It is also not possible to change the grading or make any changes that influence the sample statistics.

Picture run will make a picture for all measurements in the sample. The **Remark** for a sample can be used to type a sample related remark.

Change samples settings makes it possible to correct a mistake when a form is used and the wrong field item is selected. For example when the sample was created the HK22 bonder is set. However this should have been the HK12. This option makes it possible to adjust the samples designation.

Grading run is used to grade all the measurements in a sample. The grading run opens a screen with some settings for the grading run.

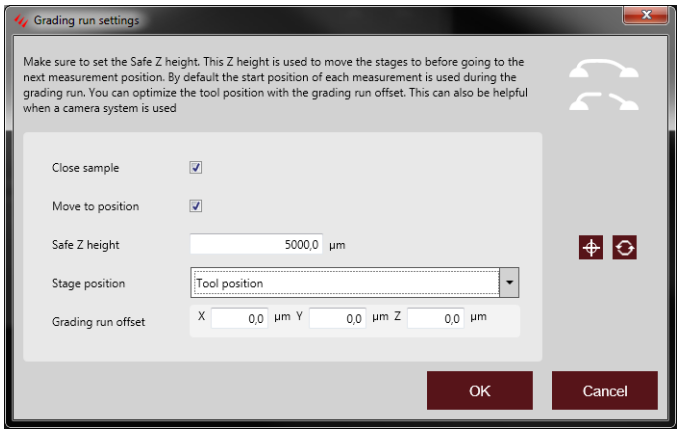


Figure 58: Grading run settings

Close sample can be used to automatically close the selected sample after the grading run. **Move to position** moves the test position under the selected camera or the microscope/tool position. The **Save Z height** is used to move between test positions to avoid collisions. The refresh ( ) and position ( ) buttons can be used to get the current z-height (refresh) or move to the set z-height (position) The **Stage position** selects using the tool/microscope position, the left camera or the right camera. **Grading run offset** can be used to optimize the position to determine the grading. This is a relative offset from the test position. Confirm with **OK** to start the grading run.

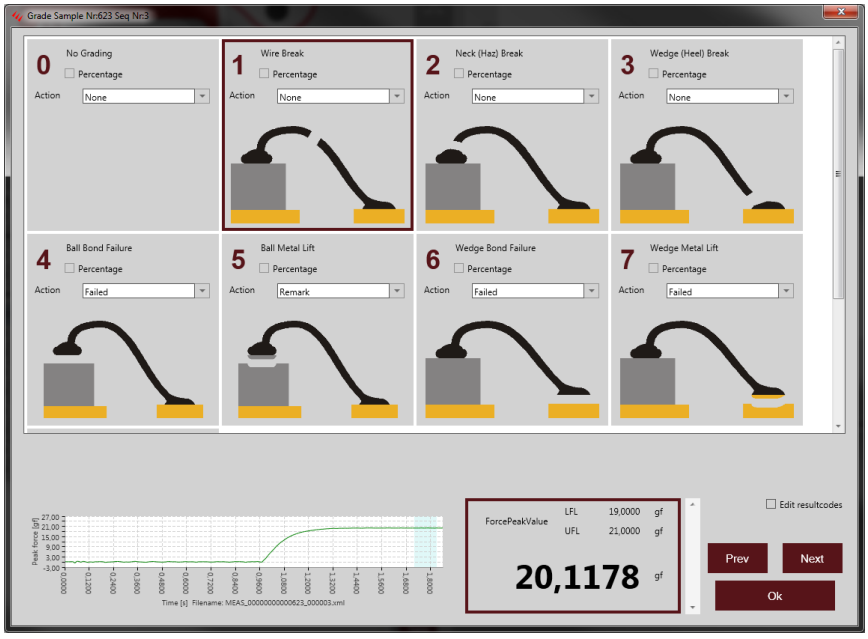


Figure 59: Grading window during the grading run

The title bar for the grading window shows the current sample- and sequence number. The buttons **Prev** and **Next** are only available for the grading run. The **Next** button selects the next measurement. If **Move to position** is enabled in the previous screen the system will automatically move the test position under the microscope/tool position or camera. The **Prev** button will select the previous measurement and when **Move to position** is enabled in the previous screen the system will automatically move the test position under the microscope/tool position or camera. Click **OK** when the grading is finished for this sample.

Trigger export can be used together with the Sigma Export software to force a new export for the selected sample.

Under measurement the measurement related options are shown.

Disable from statistics will disable the measurement from the statistics. The software will show the number of disabled measurements. These measurements are however not used for the statistical calculations.

Regrade will open the Grading window to change the grading for the selected measurement.

Delete will delete the selected measurement(s).

Transfer is used to move a measurement from one sample number to a different sample number. A window will open with the available sample numbers for the transfer.

Export to csv creates a csv file with the force graph data for the selected measurement(s).

Export to XML creates an XML file with the force graph data for the selected measurement(s).

Both export files are stored in the C:\Users\Public\Documents\Xyztec\Sigma\Results directory.

Make picture opens the camera Window to make a picture for the selected measurement.

Remark in this case is the measurement remark. The measurement remark can be used to document any specific situations for the tested part (for example when a wire was damaged before the test).

Trigger export can be used together with the Sigma Export software to force a new export for the selected measurement(s).

Set positional correction factor opens a Window to set the positional correction factor. This factor can be used if the wire lengths are different, to make the test results comparable. It can also be used to compensate for the force triangle.

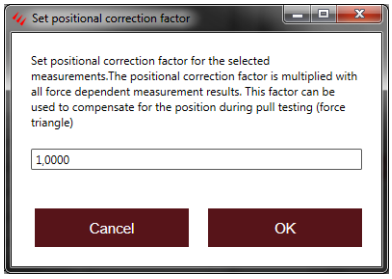


Figure 60: Positional correction factor

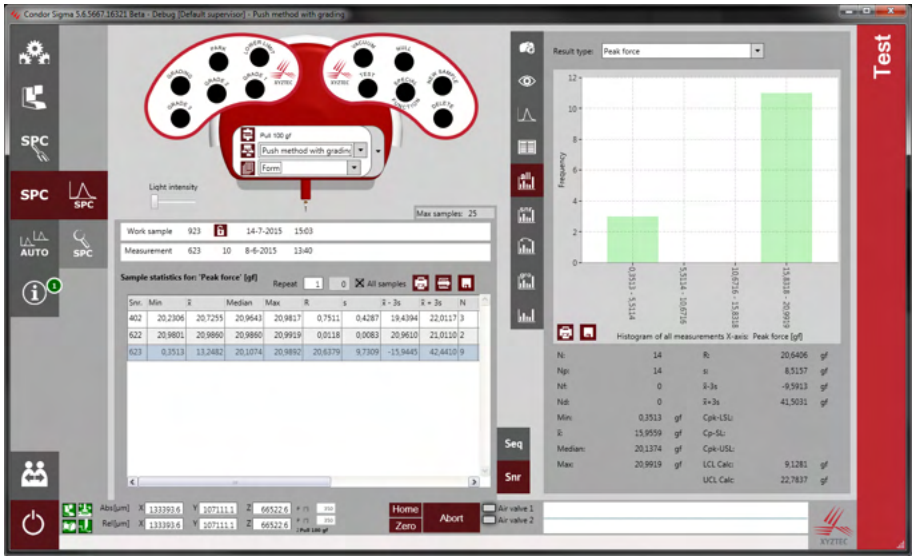


Figure 61: Sample statistics selected

Besides the data grid with the measurement data it is also possible to switch the view from measurement data to the sample statistics. Click **Snr** to select the sample statistics and **Seq** to select the measurement data.

If multiple results are available it is also possible to get the statistics for a different result type. Below example shows how to select the result type. For the selected method a lot of result types are available.

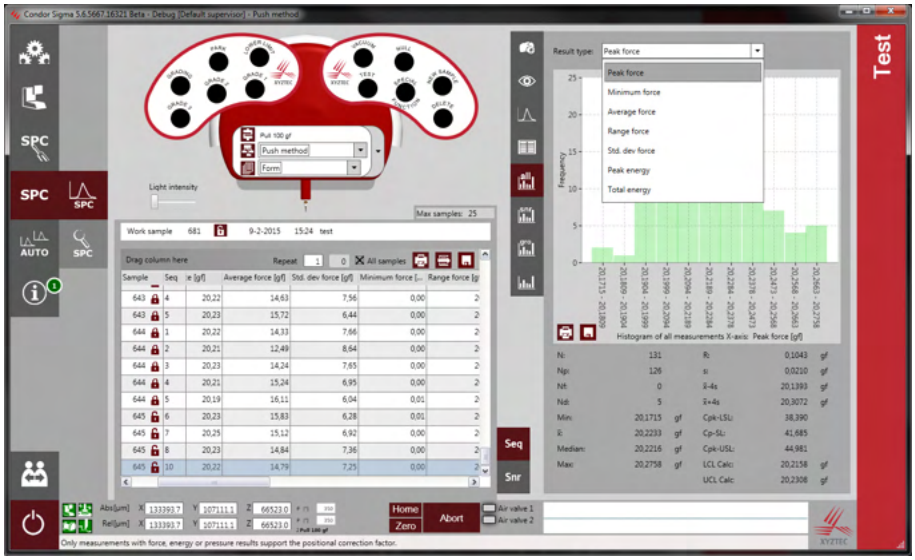


Figure 62: Selecting a different result type

If a different result type is selected the trend graphs and all measurements statistics will immediately reflect this. The Sigma software offers full SPC on all available test results. In the next screen the trend graph for the sample statistics is shown.

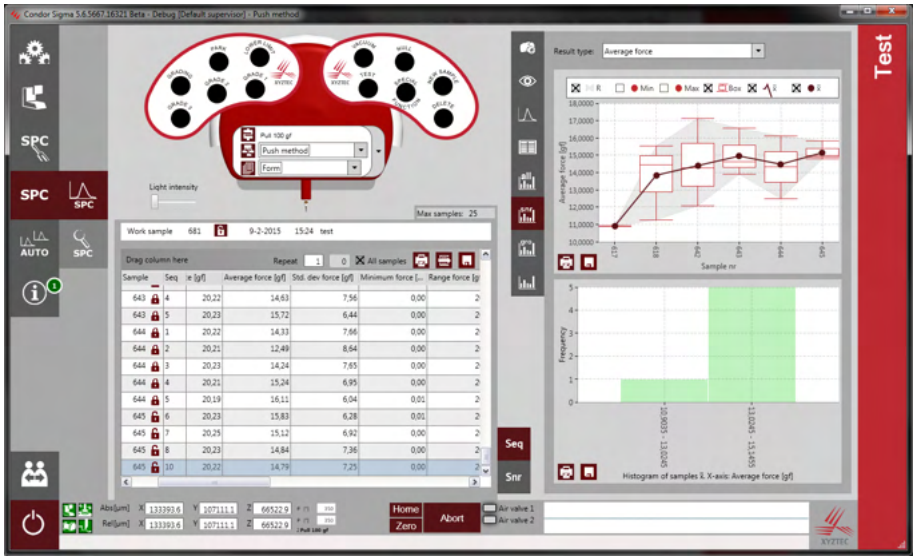


Figure 63: Average force selected and trend graphs for the sample statistics is shown

Three programmable positions can be used to speed up testing and simplify loading/ unloading samples. The buttons (I) Initial Position, (U) (Un)load Position and (C) Cleaning position, can be programmed in the “Measurement unit and sensor settings” screen for each sensor.

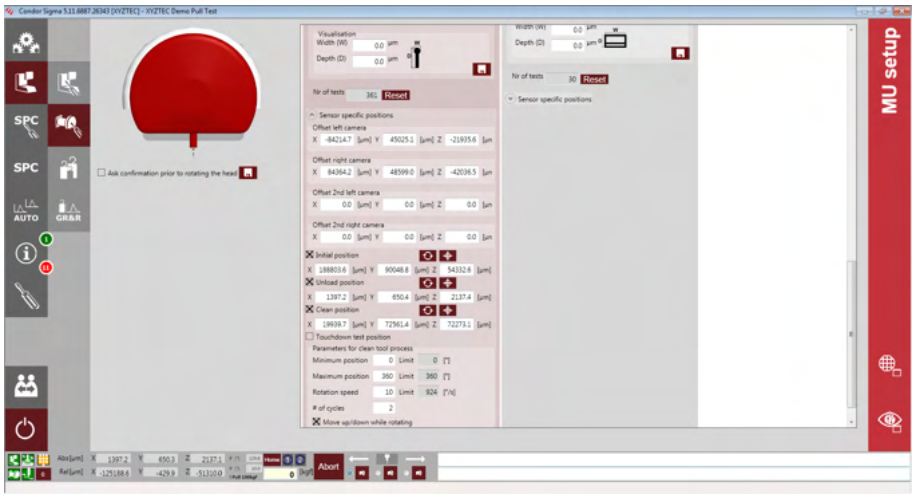


Figure 64: Sensor settings screen for programming default locations

The buttons in the SPC screen can be used if they are programmed for the currently selected sensor.

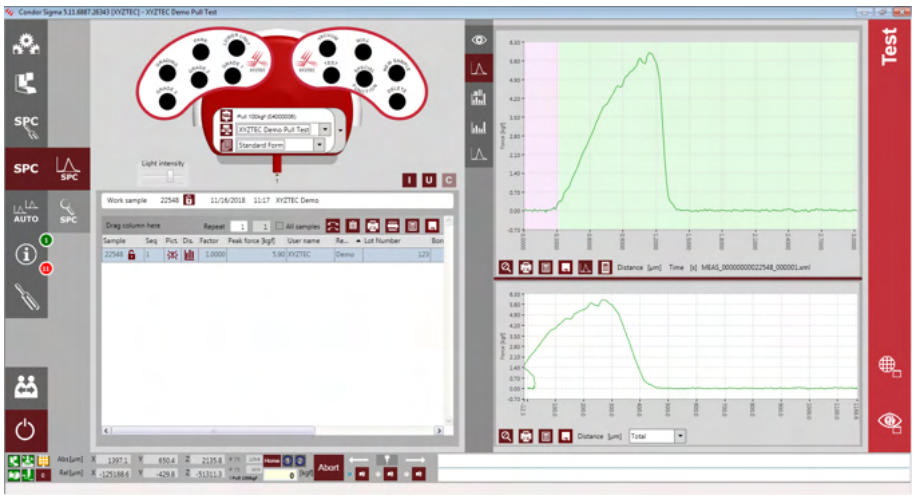


Figure 65: SPC screen with initial and unload button activated

The “Initial position” button is normally used to move the stages close to the testing location. The “(Un)load position” usually moves the stages towards the operator and the measurement unit to the top, in order to create easy access to the work holder for changing the sample. The “Cleaning position” can only be used, if a cleaning unit is installed on the system.

15 Query screen

The Sigma software also offers a very easy to use option to query the measurements. In the SPC sub menu the second choice shows SPC with a magnifying glass. Under this menu choice you can find the query screen.

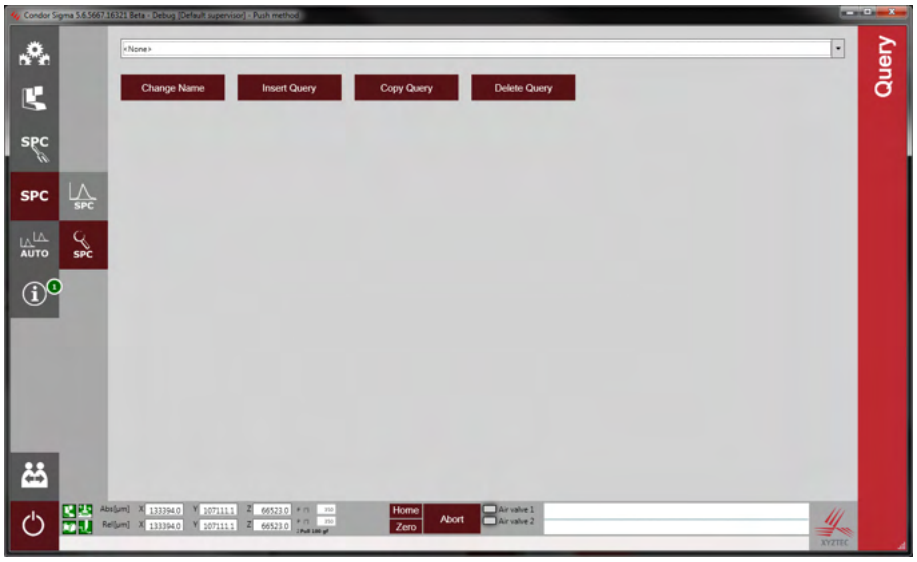


Figure 66: Query screen, no query created or selected

By default no query is selected and the data grid with the query results is empty. Click **Insert Query** to create a new query.

Figure 67: Insert query

The Insert/Edit query dialog window offers a query number that cannot be changed and a query name. Use clear names for the query to make it easier to locate specific queries. Click **OK** to confirm and go back to the query screen.

The new query is now created and all measurement data is is shown in the data grid with the results. Only a default set of columns are shown. The idea behind the query screen is to limit this complete set until only the required data is left. To limit the data you can use the filter options in the column headers. If the mouse cursor is moved over the column header an arrow is shown after the name of the column. Click on the arrow to see the unique values available for this column. Select the values that are needed. It is possible to select multiple values. Below screen shows the filter for the sequence column.

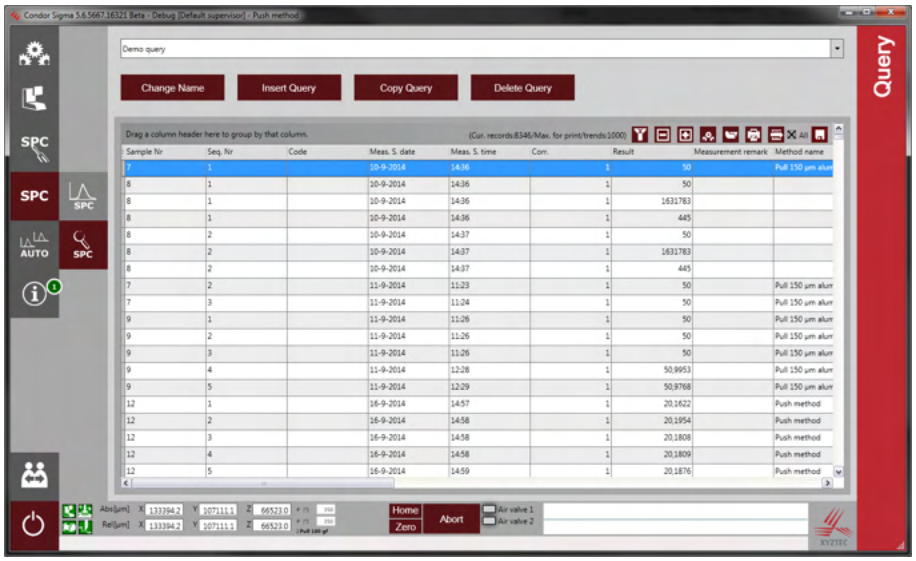


Figure 68: All measurement results and the default columns

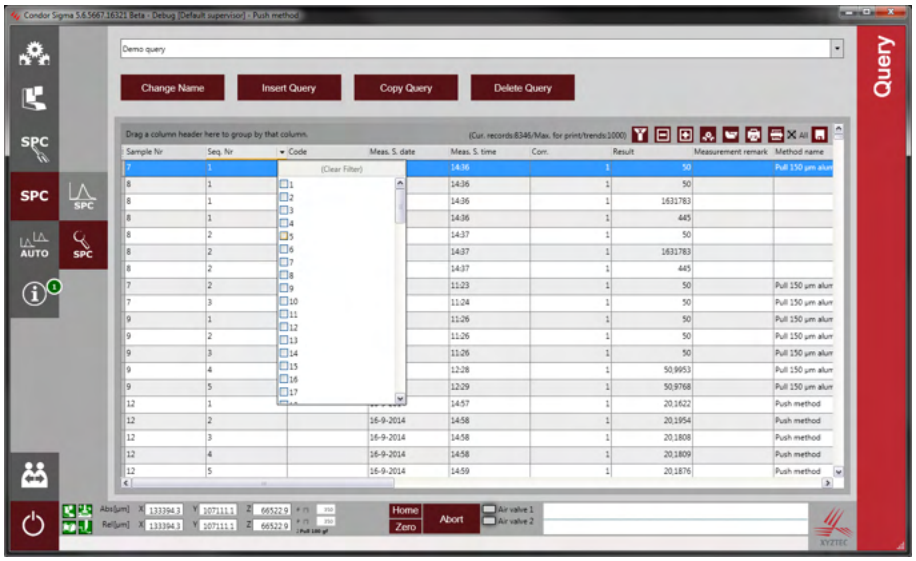


Figure 69: Filter menu for the sequence number

To add additional columns right click on any column header. Select the required columns by clicking on the column name. It is also possible to hide available columns. A check mark shows if a column is visible. The number of available columns also depends on the number of available fields. Up to 25 fields can be shown.

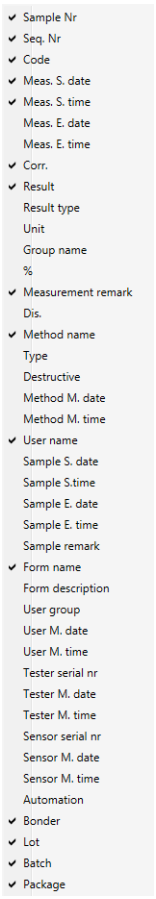


Figure 70: Available columns for the query screen

In the example above the form name, bonder, lot, batch and package columns are added to the default set. After this the query screen looks as below. It is now possible to filter on the form name or one or more specific fields.

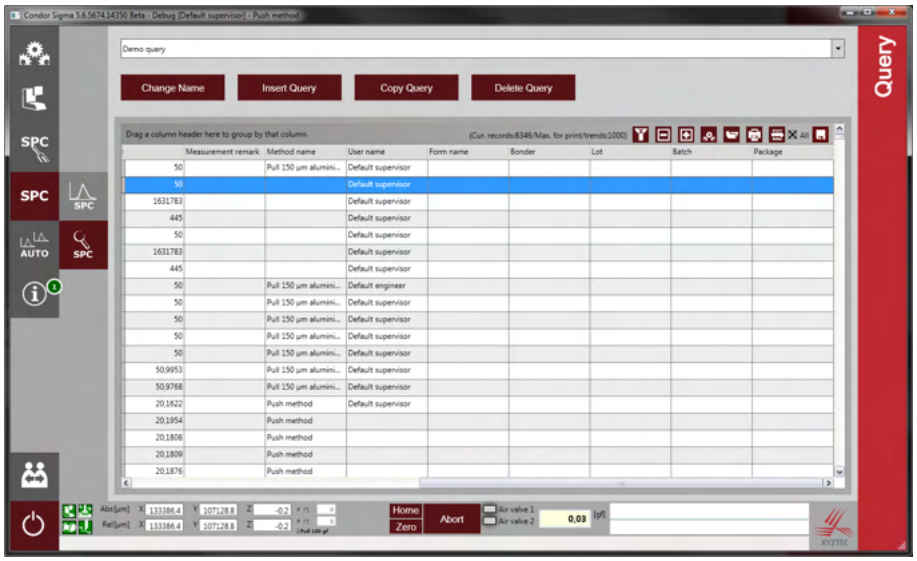


Figure 71: Query screen with additional columns

In this example we will first filter on the form name. In the list the form with the name Form is checked. The query screen looks like below:

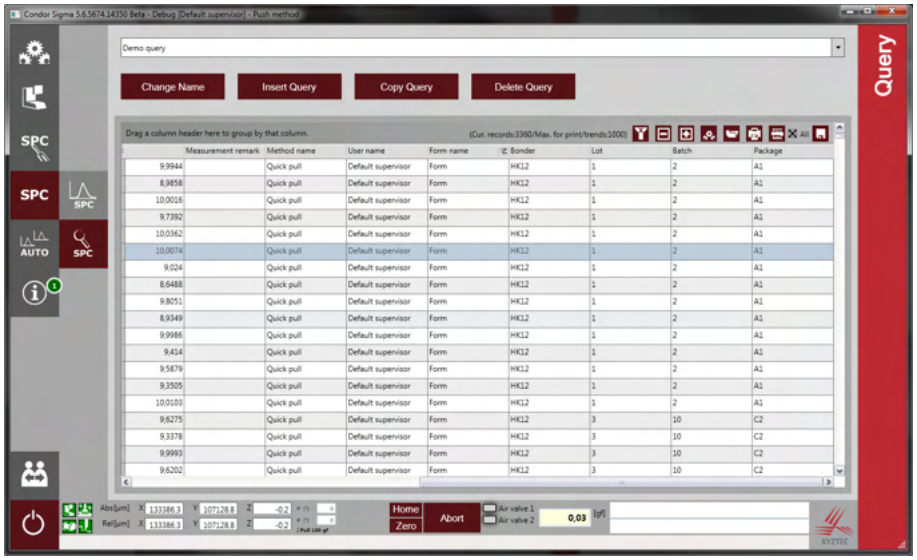


Figure 72: Query screen with selected form

If a filter is active the software will show a filter symbol behind the column header. Next we will filter on the column bonder and select the HK22 bonder. The query screen now looks like below.

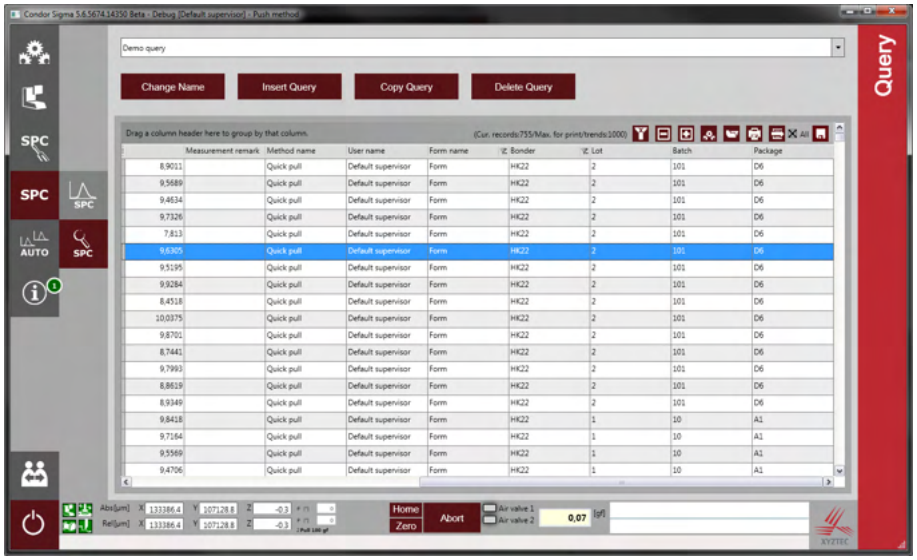


Figure 73: Query with added filter on bonder HK22

The software shows our result set has 755 records. When the result set is below the 1000 records the results can be printed ( ) or exported. ( ). The save button ( ) will store the current query layout, with the selected filters. The settings button ( ) opens a window with query specific settings for the units. By default the user setting and the currently selected sensor are used as the base setting. This makes it possible for a operator that works with the unit gf to print a report with the unit N.

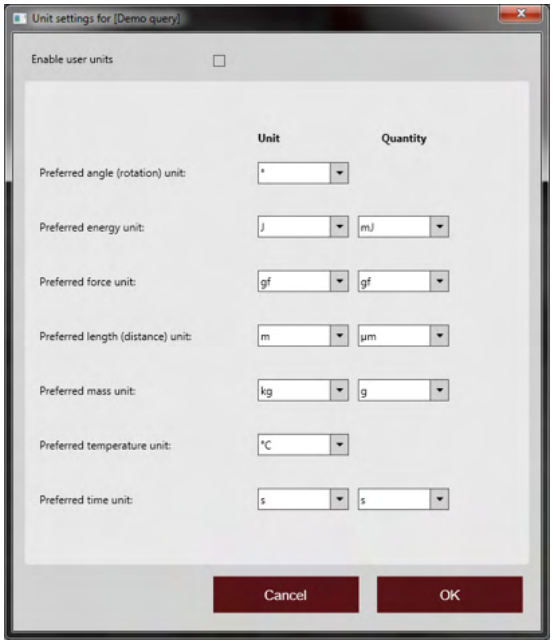


Figure 74: Unit settings query

Make sure to uncheck the option **Enable user units**. After this the units for the angle, energy, force, length, mass, temperature and time can be selected. For some units the quantity can also be set. Click **OK** to confirm. Unit settings are also stored with the query. Make sure to click the save button after making adjustments.

The button set print report ( ) opens a dialog to select a specific report. The reports for the Sigma software can be found in the directory C:\Users\Public\Documents\Xyztec\Sigma\Reports. Reports use the extension mrt.

The plus ( ) and minus ( ) buttons can only be used when a grouping is used. Plus will open all groups, minus will close all groups.

If **All** is checked the software will always show all column data. If **All** is not checked the current filters will be used for the filter selections.

The query screen also offers to group the data on a specific column. In this example we will group the data on the sequence number. Click on the **Seq Nr.** header, keep the left mouse button pressed and drag the column header in the area for grouping the data. The query screen will now show the data with the grouping.

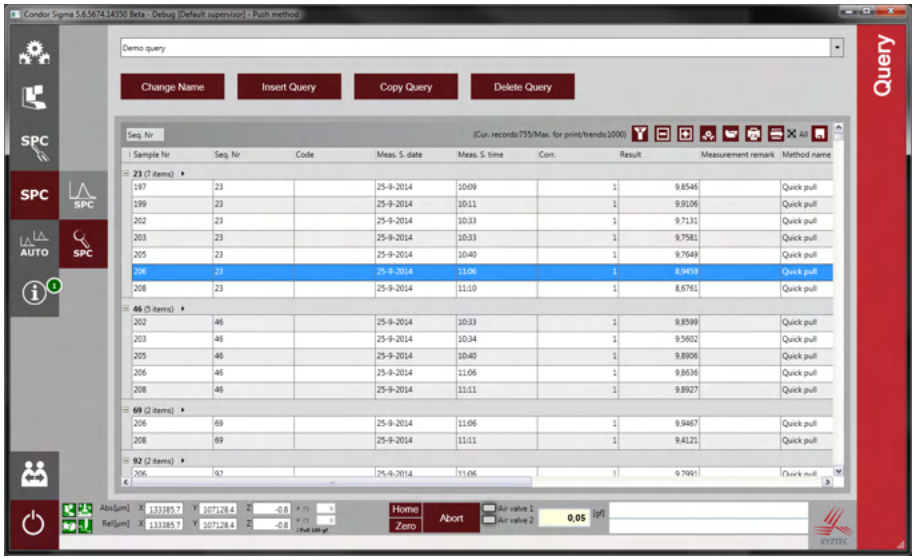


Figure 75: Query screen with a grouping on the sequence number

A right click on a measurement result shows a popup menu.

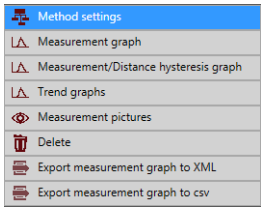


Figure 76: Query popup menu

The option **Method settings** opens a window with the method settings used to get this measurement result. The method settings window is opened. The left side of the window shows the current method settings, the right side shows the settings used when the measurement was made.

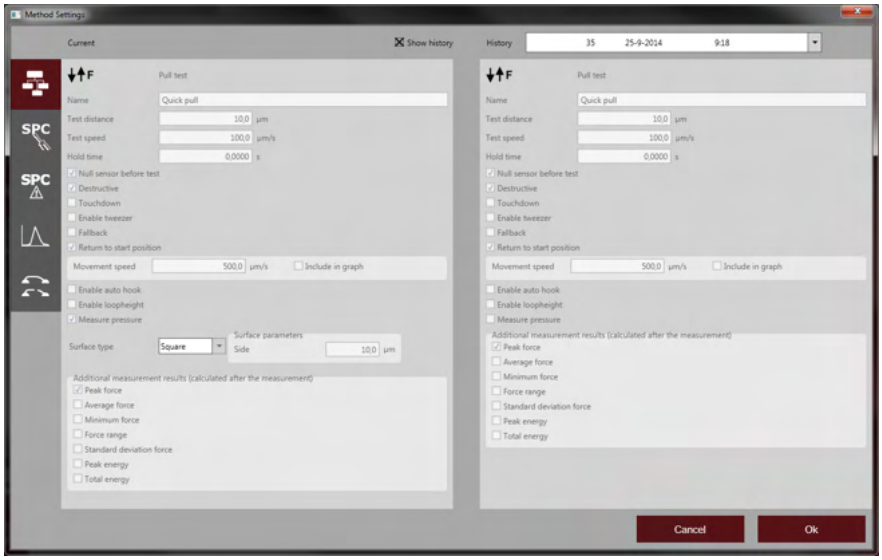


Figure 77: Method settings in the query screen

The **Measurement graph** opens the measurement graph for the selected measurement result. **Measurement/Distance hysteresis graph** opens the hysteresis graph for the selected measurement result.

Trend graphs generates the statistics for the currently available measurement results. After this a window is opened. This window offers the same statistical options and graph options as the test screen.

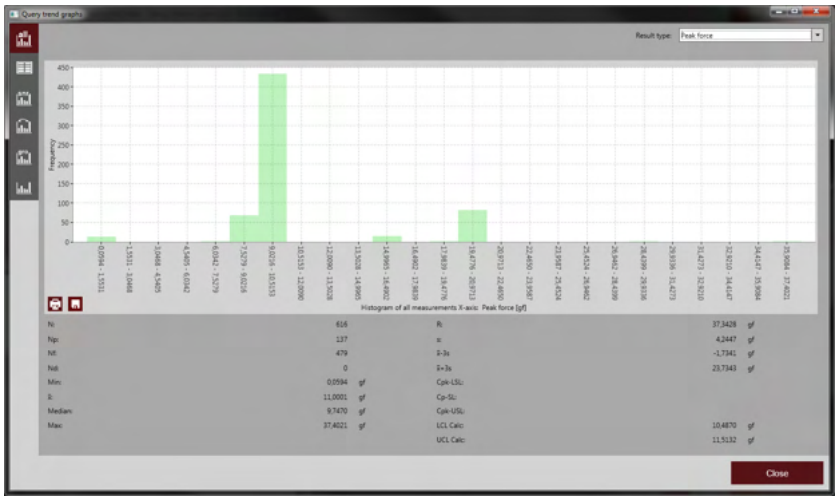


Figure 78: Trend graph for the available measurement results

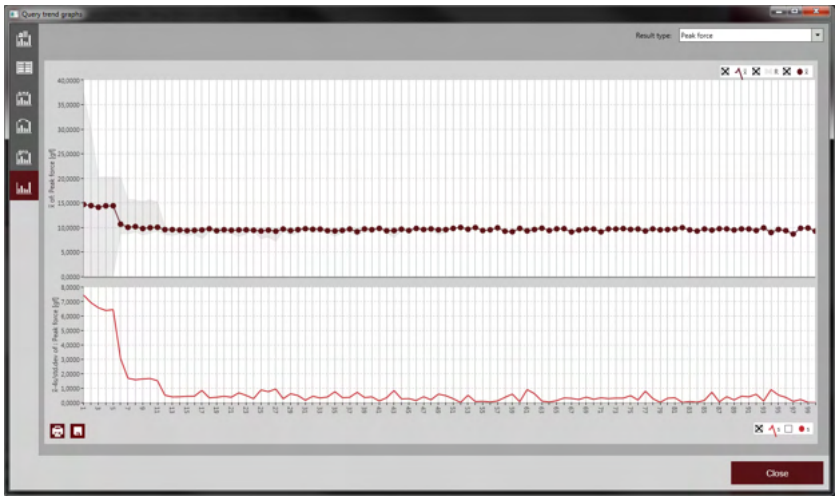


Figure 79: X-bar and standard deviation charts

Measurement pictures opens a window showing any available pictures for the selected measurement.

Delete makes it possible to delete the selected result(s).

Export measurement graph to XML exports the selected measurement result(s) to an xml file. This works the same as the export feature in the test screen.

Export measurement graph to csv will export the selected measurement results to a csv file.

Last but not least it is also possible to sort the data in the query screen in a special way. To sort the **Sample Nr** in ascending order left click the column header once. Click again to sort in descending order. A third click will remove the sort order.

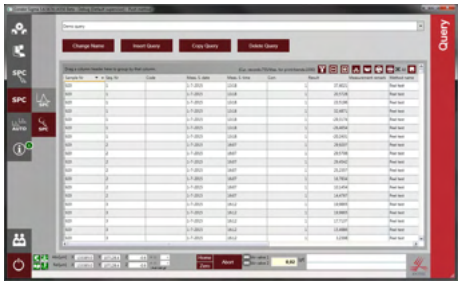


Figure 80: Query screen with samples sorted in descending order

The sort order is also saved with the query. Another nice feature is the column filter for the date or the time. The below picture shows the filter for the date.

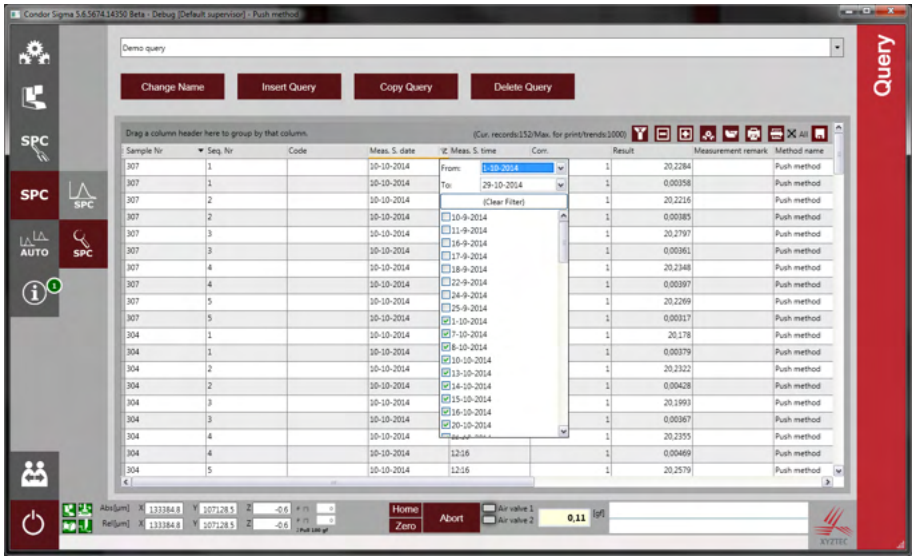


Figure 81: Filtering on the measurement start data

The From and To selections make it easy to select a specific range of dates.

16 Setting up an automatic export

The Sigma software offers a specially developed SPC export formatter that can be used to format the data in the system to any required format. The formatter also allows basic calculations. This formatted data can be stored in a specific file, send to a COM port or in the future send to other interfaces. Although the formatter does require some basic knowledge of programming the interface is still easy enough to learn and setup your own export.

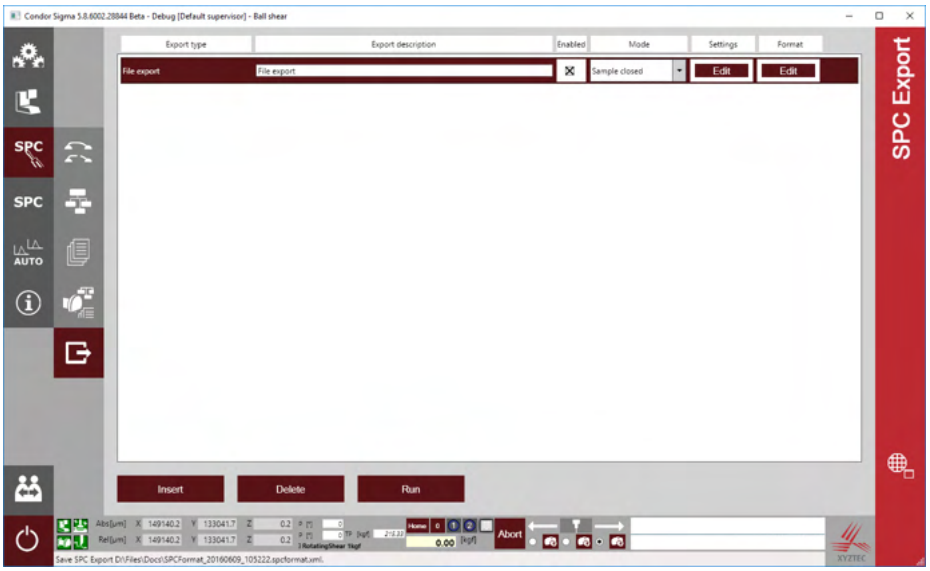


Figure 82: Export screen

The software supports multiple exports that can be enabled when needed. Click the checkbox in the **Enabled** column to enable an automatic export. Data can be exported when the sample is closed or when a measurement is made. In most cases (especially when measurements need to be graded) it is most practical to export when a sample is closed. Click below mode on the selection box and choose **Sample closed** or **Measurement based**, depending on your needs.

Click **Insert** to create a new export. Click **Delete** to remove an export. Click **Run** to test the export on the latest sample and measurements.

To change the export settings click the **Edit** button in the **Settings** column. To change the format click the **Edit** button in the **Format** column.

In the example above a file export is created by clicking **Insert**. Click the **Edit** button in the **Settings** column to view the export settings. Depending on the type of export different settings may be available. For file export it is important to set a base directory for the export.

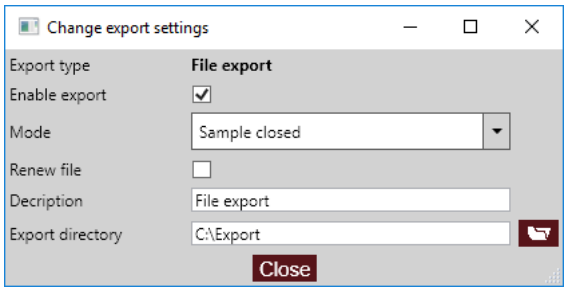


Figure 83: File export settings

For file export the export can be enabled or disabled, the mode can be changed. When the data is exported and the export file already exists the software can add the new data to the file or overwrite the current file with a new file. If **Renew file** is enabled the file is overwritten with the new data. If this option is disabled the data is added. The **Description** shows a clear name for the export. To set the **Export directory** click the Browse button and select or even create the directory for the export. In the example above all the exported data is stored in the C:\Export directory. The automatic software can also store data on a network drive. Click Close to close the **Change export settings** window.

To change or set the actual format click the **Edit** button in the **Format** column. A window is opened that shows the export format.

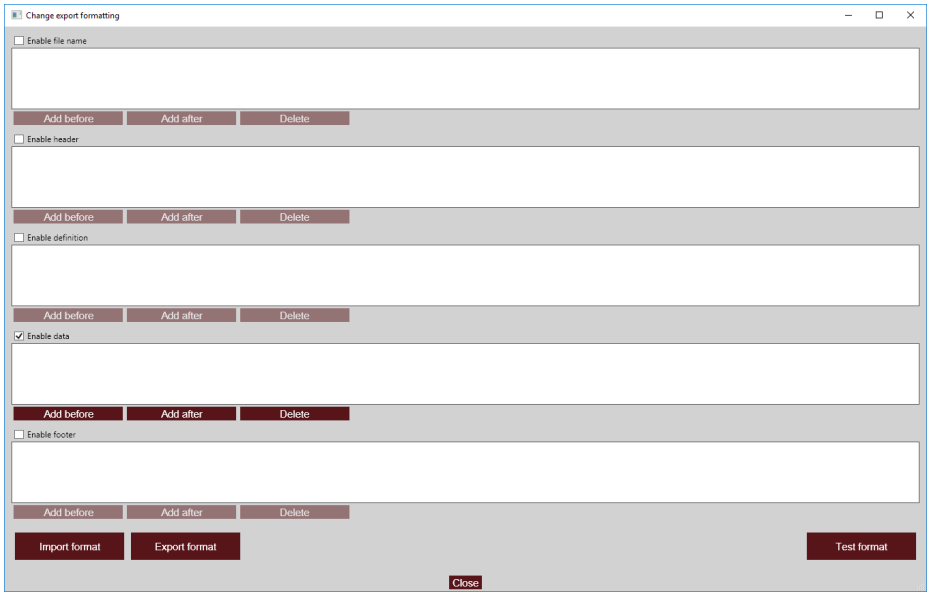


Figure 84: SPC export formatter

The export formatter offers an area to set the file name, an area to set the header, an area to set the data definition, an area for the export data and a footer at the end of the file/export.

Only for file export the **Enable file name** option is active and can be enabled. For other exports this option is disabled. Make sure to enable this checkbox to export to a file. When the file name is anabled the buttons **Add before, Add after** and **Delete** become enabled and can be used to add items to the file name area.

Click the Add after button. A new Window is opened showing all available text items and predefined tokens.

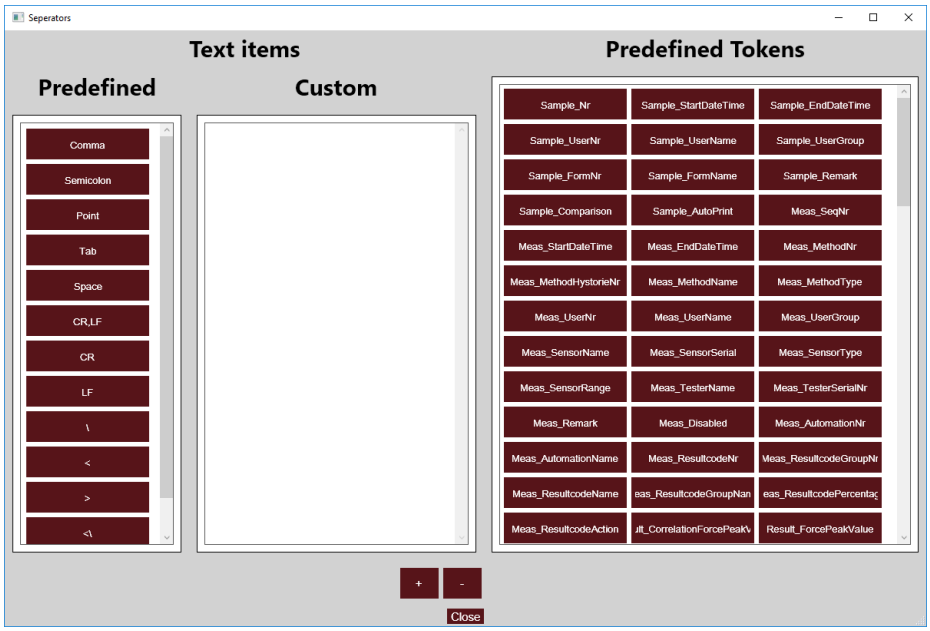


Figure 85: Text items and predefined tokens

Text items can be separators like a comma, semi colon, end of line etc. Custom items can also be created. The predefined tokens contain all available data. For example the token Sample_Nr contains the sample number.

In this example click the Sample_Nr token. The token is added to the file name area.

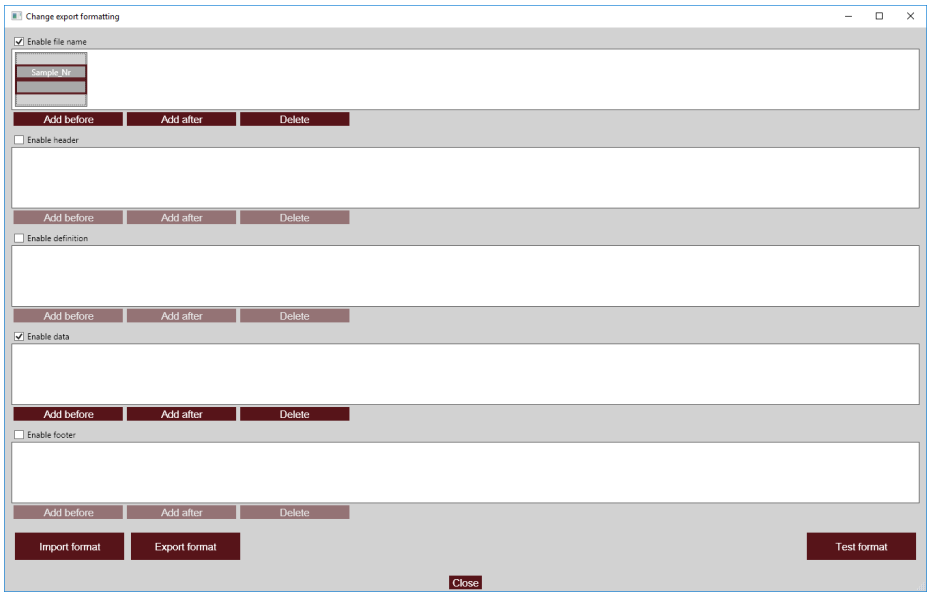


Figure 86: Sample Nr token added

Now by default is our data has sample number 1 the file name would be 1. For sample number 15 the file name would be 15. When you would now export the data and look in the export directory the sorting of the file name would not be very nice. Your file list could look like 1,10,11,2,3 etc. It would be nicer to get something like 00001, 00002, 00003 ... 00010 etc. To change how the sample number should be formatted during export double click on the token. A window with the tokens settings is opened.

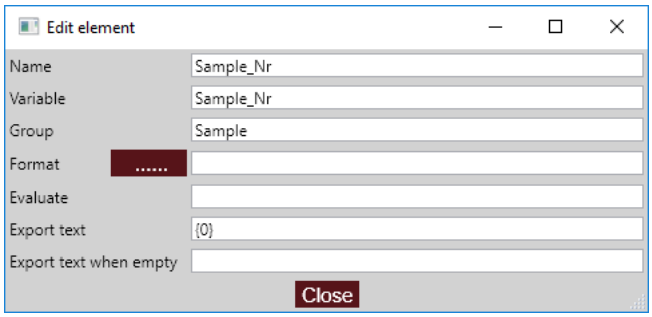


Figure 87: Edit element

The **Name**, **Variable** and **Group** are preset and cannot be changed. To change the format click the button after **Format**. A special format builder window is opened that can help to format the value correctly.

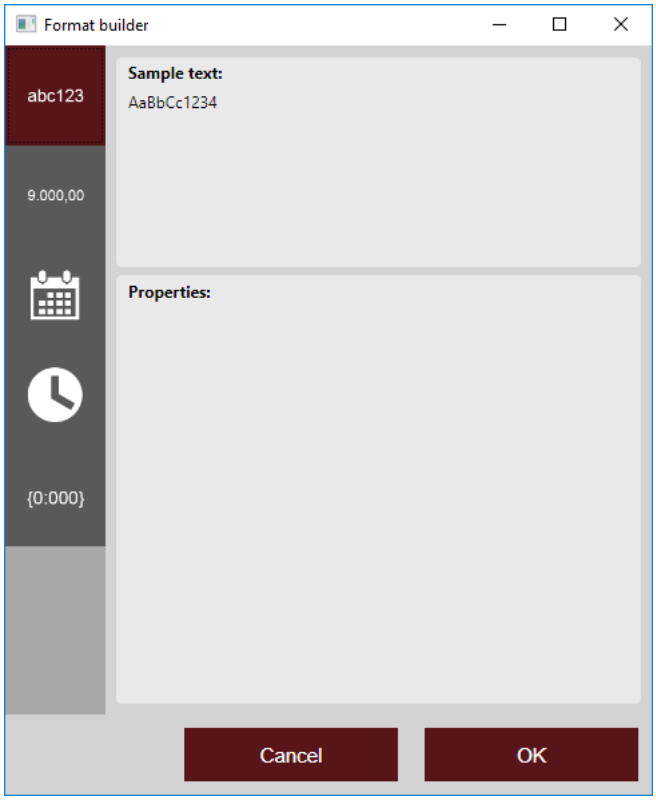


Figure 88: Format builder

On the left side a menu bar offers multiple format options. The default for a text value is no format at all. The text AaBbCc1234 would be exported as AaBbCc1234. Only in rare cases a text value should be formatted.

The ( ) choice will not perform any formatting. The ( ) choice offers settings for numerical formatting. The ( ) choice offers settings for formatting a date. The ( ) choice offers settings for formatting a time. The ( ) choice offers settings for some custom formatting.

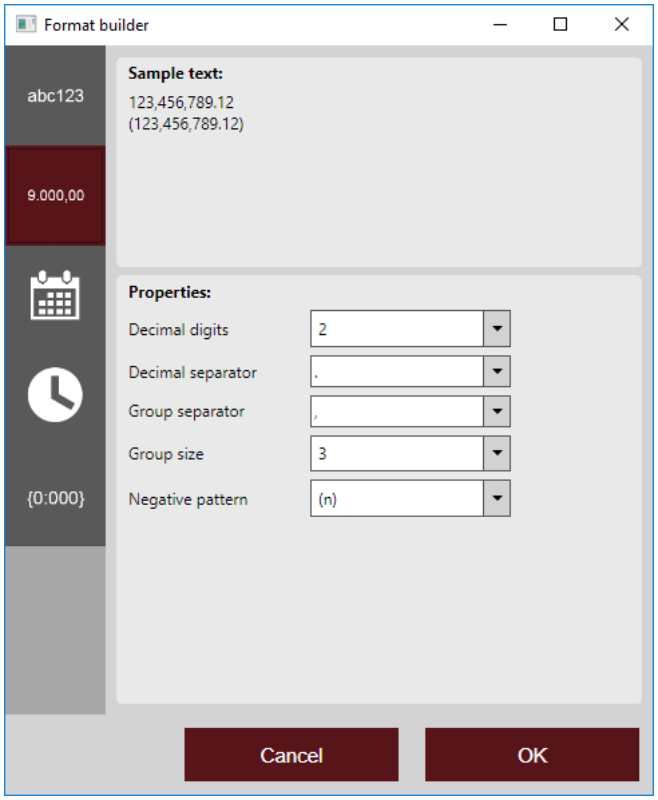


Figure 89: Formatting numerical values

The formatting options for a numerical format are:

Decimal digits.	Number of decimal digits. If set to 2 digits a value like 2124.3456 is exported as 2124.34.
Decimal separator	The decimal separator used. This can be a point (.) or a comma (,). With a comma the value 2124.3456 is exported as 2124,3456.
Group separator	The separator for numeric grouping. In some countries a separator is used for all thousands. The numeric value 123456.456 becomes 123,345.456 if the grouping separator is set to a comma. To not use any grouping make sure to select the empty separator. Grouping helps to make large numbers more readable.
Group size	By default grouping is often done with every thousand (group size 3). This can also be set to every hundred. The value 123456.456 becomes 12,34,56.456.
Negative pattern	Negative numbers can be displayed like:

(1) => setting (n) for the value -1,

-1 => setting -n for the value -1,

- 1 => setting - n for the value -1,

1- => setting n- for the value -1

1 - => setting n - for the value -1

With these settings most numerical values can be formatted as required.

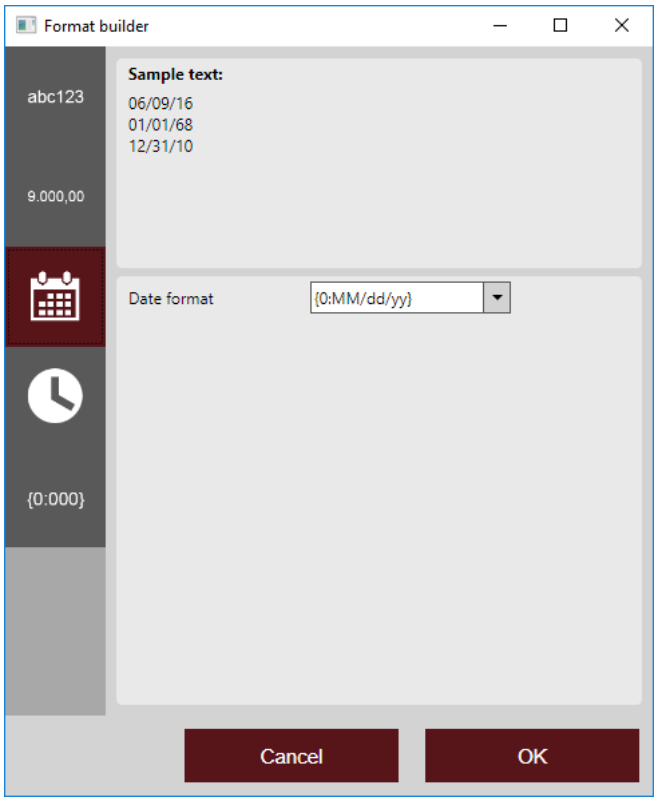


Figure 90: Formatting the date

For formatting a date the following options are available:

{0:M/d/yyyy} The 6th September 2016 becomes 9/6/2016

{0:MM/dd/yyyy} The 6th September 2016 becomes 09/06/2016

{0:MM/dd/yy} The 6th September 2016 becomes 09/06/16

In general M is the month number. MM would show month number 1 as 01. The d is the day of the month, day 1 would shows as 1, dd would show day 1 as 01. The yyyy shows the full year number. The yy shows only the last two digits. For the separation of the month, day and year and the order (month, day year or day, month, year for example) multiple options are available.

Choose the best fit for the date. It is also no problem to generate your own date format. For example something like {0:yyyyMMdd} would give you 20160906 for the 6th September 2016.. You can also use the format to get the year, month or date separately. For example {0:Y} would export 2016 only for the 6th September 2016.

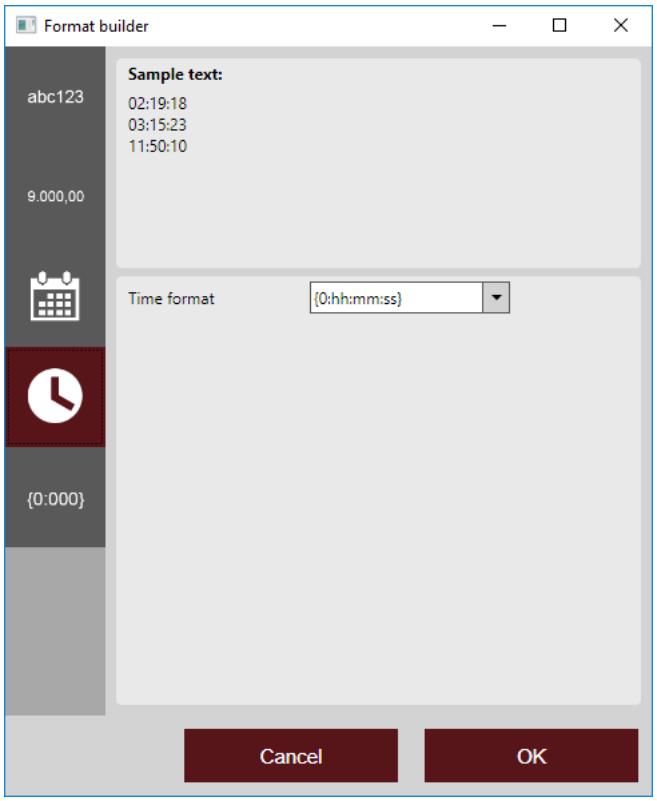


Figure 91: Formatting the time

For the time h shows the hour. One h shows 1 o clock like 1:00:00. The hh would show 1 o clock as 01:00. This is the time based on a 12 hours scale. HH would show the time based on a 24 hours scale. The m stands for the minutes. A mm would show 1 as 01. The s stands for the seconds. The ss shows 01 for one second. The separator by default is :. We also offer the underscore. You can also use the format to get the hour, the minutes or the seconds for a specific time. For example {0:H} would export 14 for the time 14:09:45.

Our software also offers some custom formats. For example to format a number to 000100 (traling zero's, 6 digits). The list of custom formats may also grow in future software versions. Currently we offer traling zero's with 3 digits, traling zero's with 6 digits, traling zero's with 10 digits and traling zero's with 19 digits. We will choose the latest one for the sample number.

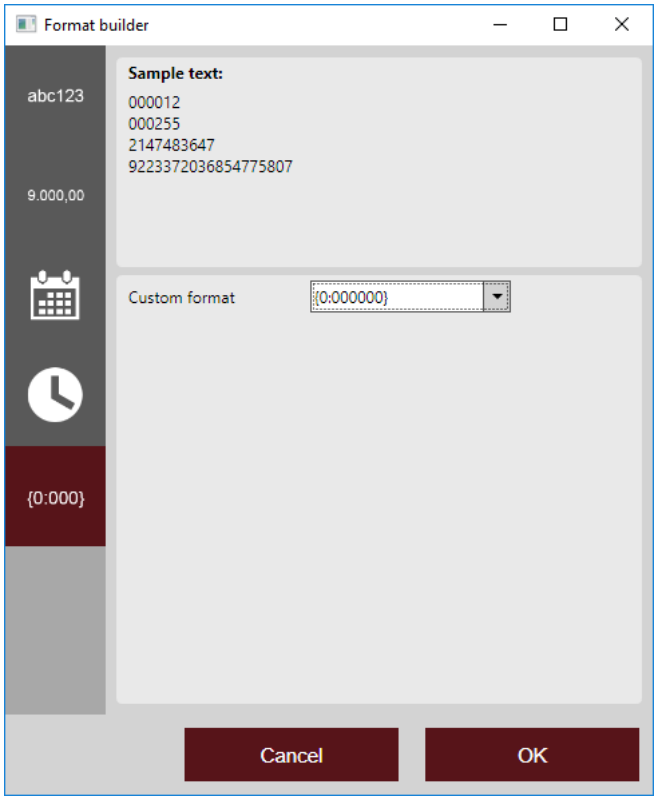


Figure 92: Custom formats

If a predefined format is not available it is possible to generate your own format.

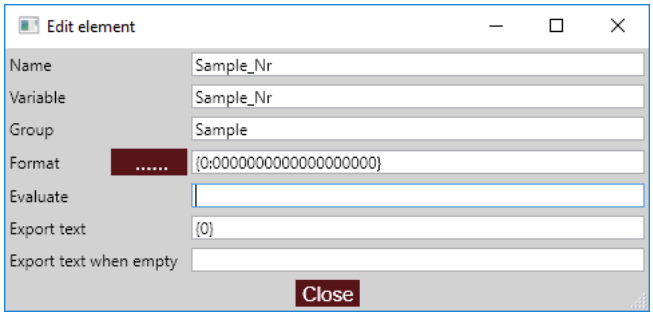


Figure 93: The format has been selected

The **Evaluate** can be used to perform calculations. We will show this later in this chapter.

The **Export text** shows how the formatted value is exported. By default the value is exported with the specified format. The label {0} is replaced with the formatted value. In this example we will export the sample number trailed with SAM and we also add the file extension .scv. The sample with number 19 is now exported as SAM00000000000000000019.csv. This would be a useful file name when each sample is exported separately.

The **Export text when empty** would be the text exported when the value is empty. A sample number will always be available. More specific data may not always be available. After this our token for the sample number looks like figure 86.

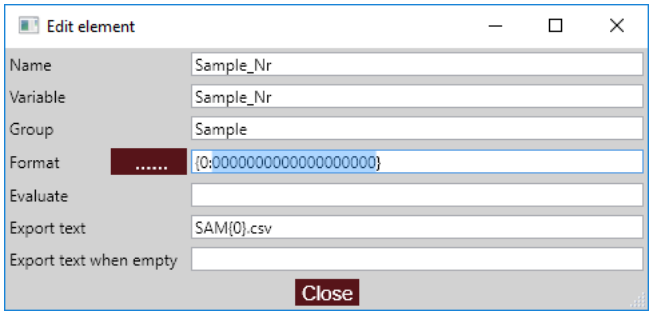


Figure 94: The formatting for sample number in the file name

We now have defined a file name.

Next we will add some data for the export.

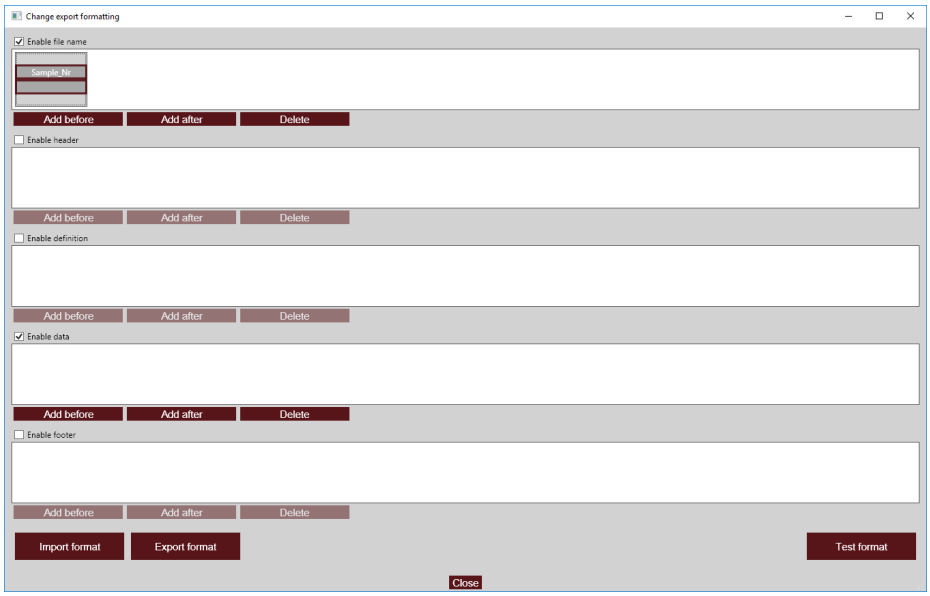


Figure 95: The sample number is used for the file name

Make sure that **Enable data** is checked. Click **Add after**. Select **Meas_SeqNr** from the predefined tokens. Click **Add after**. Select the predefined text item called Comma. Click **Add after.** Select **Meas_ResultcodeNr** for the number of the selected grading. Click **Add after**. Select the predefined text item called Comma. Click **Add after**. Select **Result_ForcePeakValue** for the peak force measurement. Click **Add after**. Select the predefined text item called CR\LF. This is actually a cariage return followed by a line feed. When used this is the end of a line in the export.

Now double click on **Result_ForcePeakValue,** we will choose a correct format for the force and also perform a calculation. For the format choose the settings in the format builder as shown in figure 88.

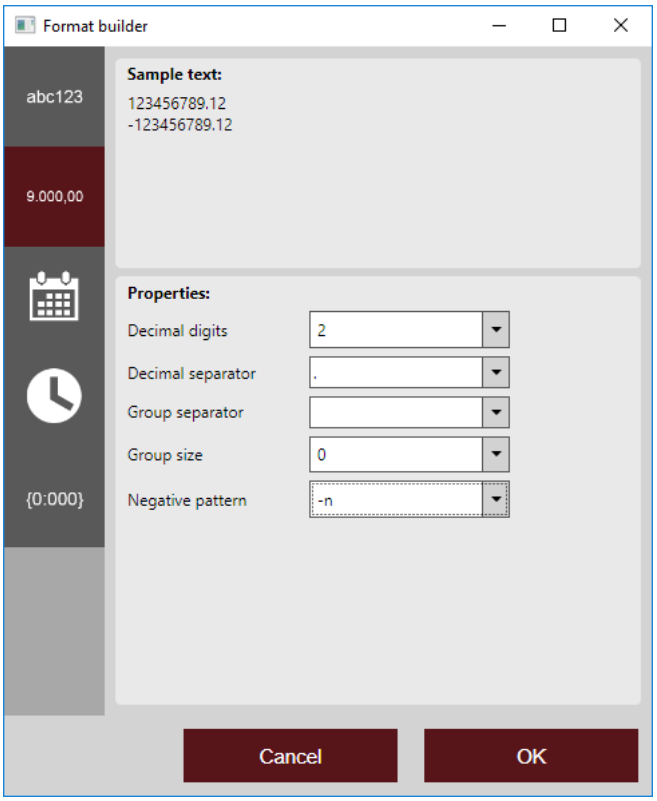


Figure 96: Format for the peak force

The format is set to 2 decimals, a point as separator and no grouping. Negative numbers are exported with a trailing minus.

For the Evaluate we will enter 101.97*Data[“Result_ForcePeakValue”]. The Data[“Result_ForcePeakValue”] is actually the peak force. This force is in Newton. If we multiply with 101.97 we have calculated from N to gf. The factor 101.97 is not the most accurate, but sufficient for this export.

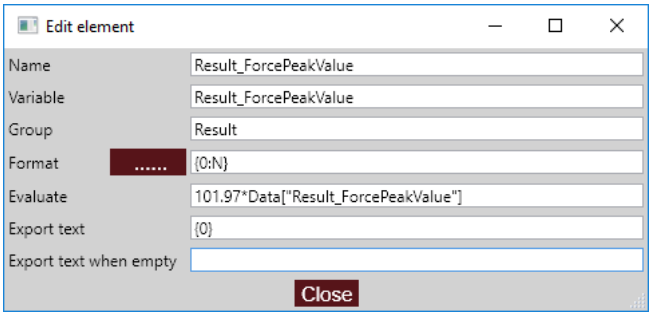


Figure 97: Settings for the peak force

Be careful when performing evaluations. A typing error will generate problems with the export.

We now have a very basic export that exports all the measurements in a sample and shows the sequence number, a comma, the grading, a comma, the peak force and a end of line.

Our complete export looks like below.

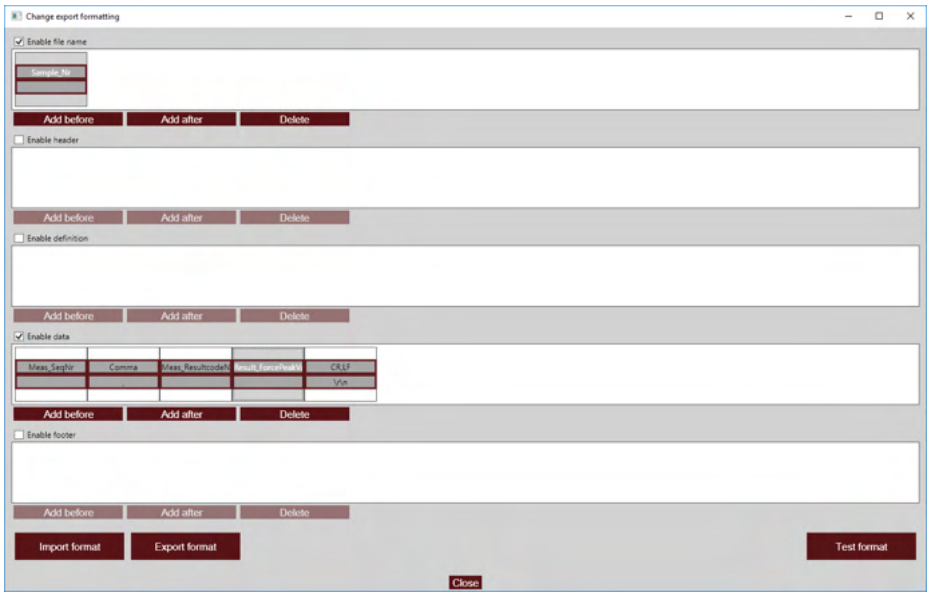


Figure 98: Basic export settings.

Click **Test format** to see a small example of how this can look. Click **Export format** to export the defined format to a xml file. Click **Import format** to import from an existing format file. Click **Close** to go back to the export definition.

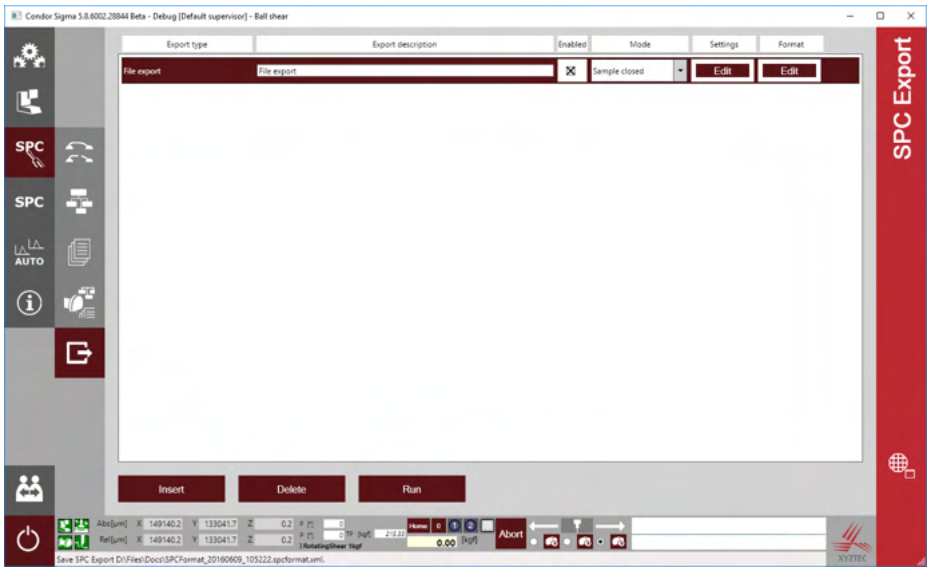


Figure 99: File export is ready to use

Select the newly created export. Then click **Run**. Now check in the C:\Export directory. A file should be available with the name SAM0000000000000000523.csv. The sample number may be different. If the file is opened the measurements in the sample are shown.

To make the export a bit easier to understand we may want to add a header. Open the format editor again. Check **Enable header**. Click **Add after** below the header area. In the window with the tokens click the **+** button below the customized text items. Use the name File header for this text item. Use Seq.Nr, Grading, Force as the text. Click the **Select** button for the text item that was created.

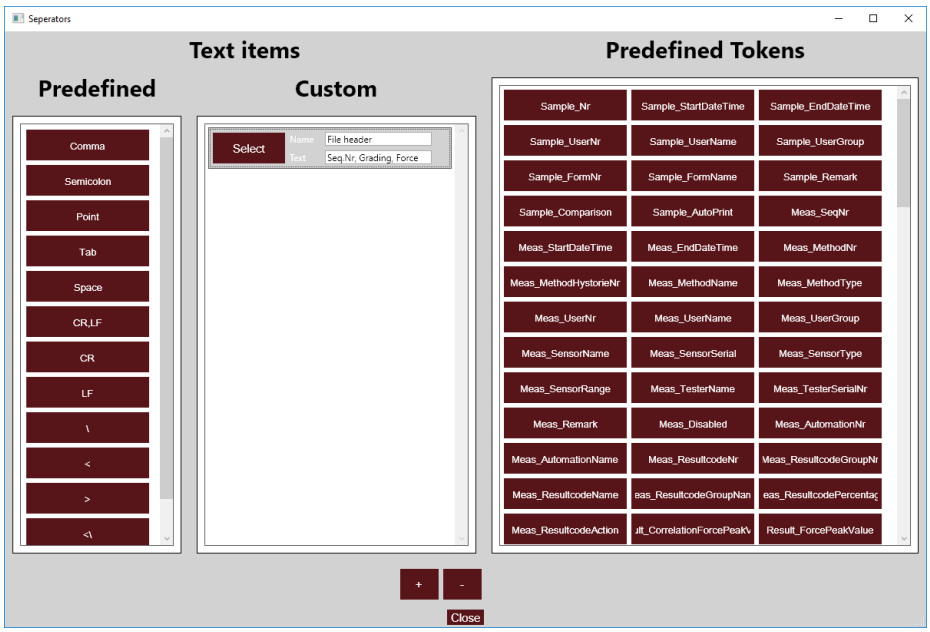


Figure 100: Custom text items

Click **Add after** again and select the **CR\LF** option to create a end of line.

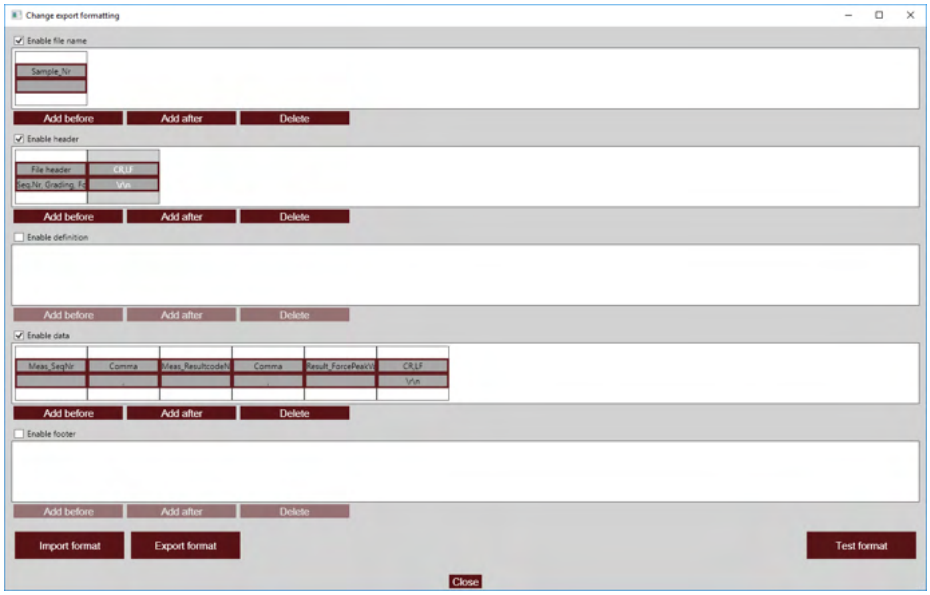


Figure 101: The header is now also ready

17 Working with a wafer loader

The Sigma W12 tester is especially designed to work with wafers. This tester can also be combined with a Waftech WL300BT or compatible wafer loader. When the tester is combined with a waferloader and also has been setup to receive and give commands to the wafer loader the status bar will offer addtional status information and the buttons **Load wafers automatically** and **Unload wafer** will become available.

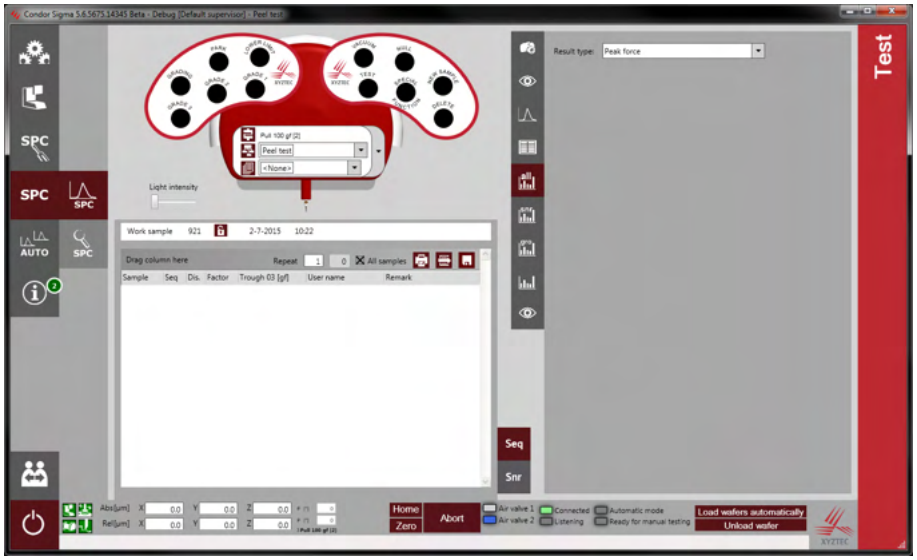


Figure 102: software with connection to the wafer loader

If the buttons or the status information (**Air valve 1**, **Air valve 2**, **Connected**, **Listening**, **Automatic mode** and **Ready for manual tester**) are not available there may be a problem with the wafer loader or the configuration. The status lights for **Air valve 1** and **Air valve** 2 show if the specific air valve is active or not. **Connected** shows if a connection is available with the wafer loader. This status light must be green.

For manual testing in the test screen Click the **Loader wafer automatically** button. The stages will move to the load/ unload position. The software will block the joysticks and tester control until the wafer is loaded. When a wafer is detected on the wafer chuck the software will show a green light for **Ready for manual testing**. The tester will be released and the operator can now move the stages with the joysticks and perform a test.

When the test is ready the wafer can be unloaded. Click **Unload wafer**. Again the stages move to the load/unload position. The software will block the joysticks and the wafer will be unloaded. After this a new wafer can be loaded for the next tests.

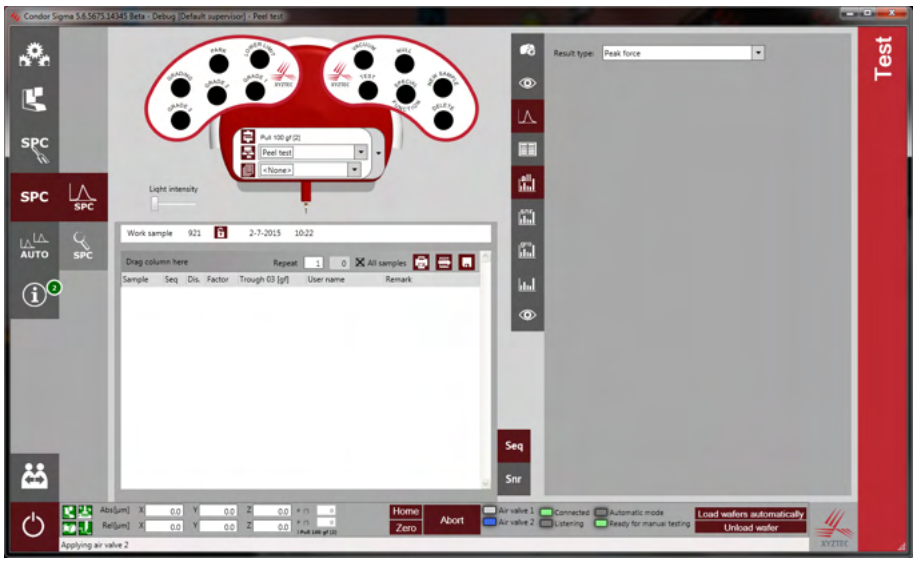


Figure 103: Test screen when the wafer is loaded, Ready for manual testing is green

If configured correctly the Sigma software on the Sigma W12 can also support full automatic testing. For this one or more automations need to be programmed and the barcode parser needs to be setup. To use automatic mode the automation screen must be active.

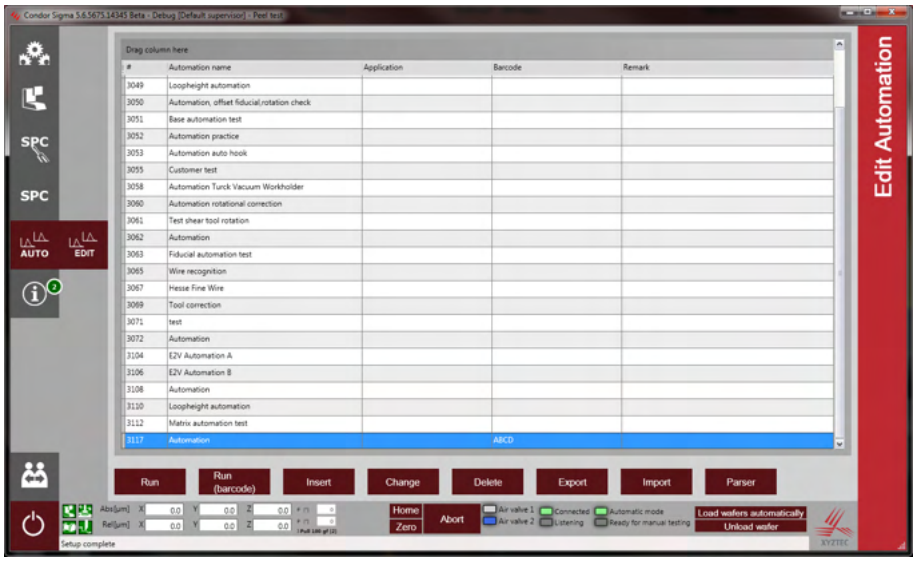


Figure 104: Automation screen with connected wafer loader

The **Automatic mode** status light should be active (green). Click **Load wafers automatically** to load the wafer. When the wafer is loaded the **Listening** status light should become active (green). The software will now also receive a barcode and use this to open the correct automation and run this automation. After the automation is ready the wafer will be unloaded automatically.

For the automation editor separate trainings and manuals are available.Maintenance schedule

18 Maintenance schedule

ITEM	WHEN				WHO
	AS NECESSARY	DAILY	12 MONTHS OF OPERATION	ONLY REQUIRED IF DISSEMBLED	
Clean machine and empty debris collection tray	X				Operator
Check quick release interface clamp	X				Operator
Check test tools for damage or wear	X	X			Operator
Cleaning linear encoders				X	Service
Lubricate linear rails and leadscrews			X		Service
Lubricate RMU locking pin			X		Service
Lubricate shear clamp gears			X		Service
Sensor calibration			X		Service
Inspect all cables for wear or damage			X		Service
Lubricate RMU locking pin (sigma, Sigma L and Sigma XL only)				X	Service

18.1Adjustment shear tool

Before doing an actual sheartest, the tool has to be mounted properly. First fit the tool on the sensor with the two bolts and tighten the screws (figure 103) so the tool can just move. Put a touchdown load of 200 grams on the tool, so it is pushed to the top stop of the sensor. Fix the two bolts, with the load applied, with a torque of 1,25 Nm.

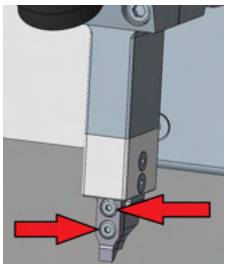


Figure 105: Adjustment shear tool

18.2 How to clean machine and empty debris collection tray

Open the drawer of the machine and clean the debris collection tray carefully as necessary with a vacuum cleaner.

18.3 How to check quick release interface clamp and the test tools

Inspect the test tools and interface clamp for damage or wear and replace these if needed. In the event of any faults which you cannot remedy yourself, please contact Xyztec.

18.4 How to lubricate linear rails and leadscrews

Lubrication of the linear rails and leadscrews should be done with Arcanol MULTITOP grease. The lubricant should be applied on the leadscrew and rails with a cloth. No big particles of the grease should be left, only a film is taken care of the lubrication of leadscrew and linear guides.

18.5 Service

Maintenances marked with “Service” should only be undertaken by a Xyztec authorised service technician. Failure to comply voids the warranty. The contact details for Xyztec are given at the back of these instructions.

19 Specifications

STAGES	SIGMA HF	SIGMA L
X-stage (mm)	500	500
Y-stage (mm)	500	500
Z-stage (mm)	200	200
Axis speed (mm/s)	500	500
Resolution linear encoders (backlash free drives) (nm)	10	10
Digital temperature correction	●	●
ACCURACY		
Accuracy (%)	1	0.075
ADC resolution (bit)	24	24
Sampling frequency (kHz)	10	10
Shear height (step back) accuracy ±1 µm	●	●
Programmable landing force down to 5 gf	●	●
MECHANICAL		
Footprint X (mm)	1200	1200
Footprint Y (mm)	1200	1200
Height (mm)	2500	2500
Weight (± kg)	1350	1350

Please contact us for more information and options for your factory. Specifications are subject to change without prior notice.

- ● Standard
- ● Optional
- ● Not available

CE

October 2020 – CESEMIV1.1 – xyztec bv

EU Declaration of Conformity

Manufacturer's name:	xyztec bv
Authorized representative:	Mr. B. van Tilborg CEO
Manufacturer's address:	J. F. Kennedylaan 14b 5981 XC Panningen The Netherlands

Declares that the product:

Product name:	xyztec Sigma series
Model numbers:	Sigma HF, Sigma MAG, LOADPORT
Serial number :	Sxxxxxxx
Accessoiries:	PMU, SMU, LMU, TMU, IMU, RMU, Joysticks, Heater Work Holder, Rotating Stage, USB Tweezers

Meets the provisions of following directives and is in conformity with the mentioned standards:

Directives:

2006/42/EC	Machinery Directive
2014/30/EU	EMC Directive
2011/65/EU	RoHS Directive (According to Article 2; "Large-scale Industrial tools")

Standards:

EN ISO 12100:2010	Safety of machinery - General principles for design - Risk assessment and risk reduction
EN ISO 13849-1:2015	Safety of machinery – Safety Related parts of control systems – Part 1: General principles for design
EN IEC 60204-33:2011	Safety of machinery - Electrical equipment of machines - Part 33: Requirements for semiconductor fabrication equipment.
EN IEC 61000-6-4:2007/A1:2011	Electromagnetic compatibility (EMC) – Part 6-4: Generic standards – Emission standard for industrial environments
EN IEC 61000-6-2:2005	Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments.
NFPA79 (2018)	Electrical Standard for Industrial Machinery
FCC 47 CFR Part 15 Subpart B	Federal Communication Commission - Title 47 - Code of Federal Regulations - Part 15, Sub part B – Unintentional Radiators
SEMI S2-0818E	Environmental, Health, and Safety Guidelines for Semiconductor Manufacturing Equipment
SEMI S8-0218	Safety Guidelines for Ergonomics Engineering of Semiconductor Manufacturing Equipment

The party authorized to compile the technical file is: xyztec bv.

Panningen, Thursday, 15 July 2021

B.M. van Tilborg
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