

## smart-process for BYK-mac i

### Step-by-Step Guide

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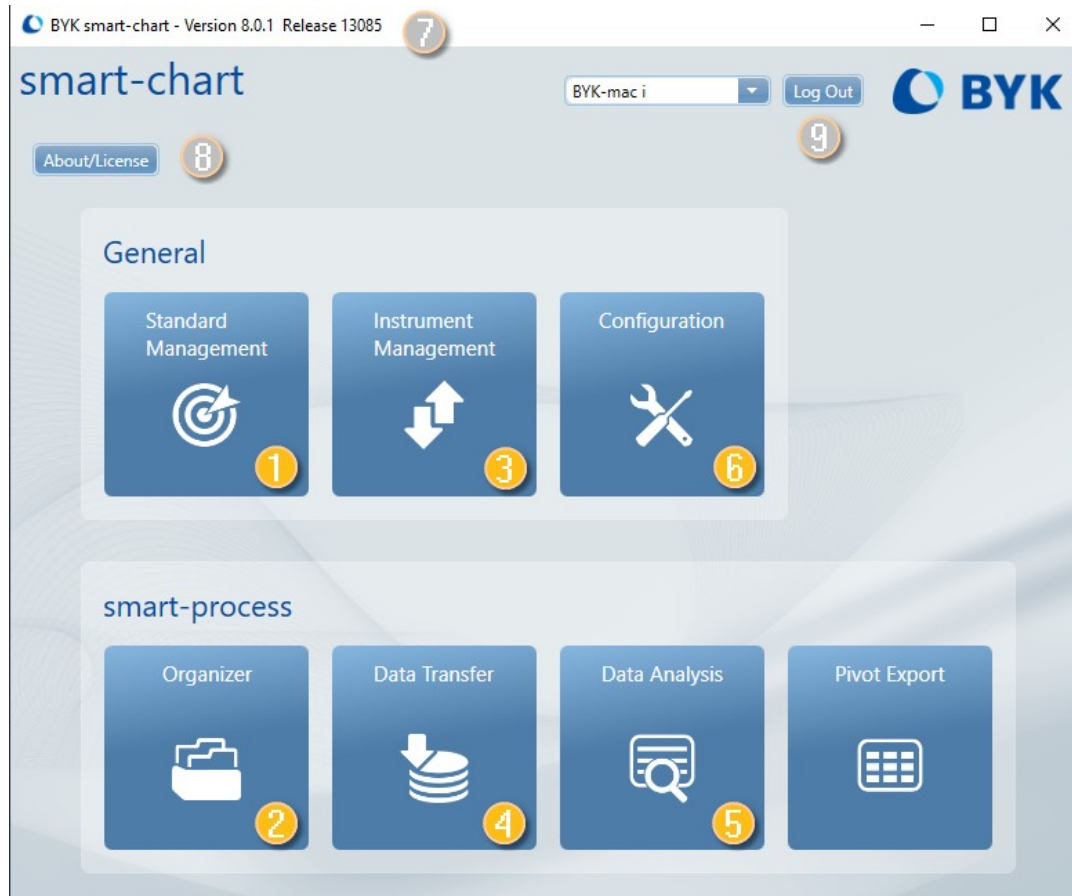
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# 1

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## System Description

The main window of smart-process consists of following elements.



1	<b>Standard Management</b>	Definition of color standards with pass/fail limits: Measurement of master panels or import of digital standards.
2	<b>Organizer</b>	Definition of a standard measurement procedure for clear sample identification and menu guided operation on the instrument.
3	<b>Instrument Management</b>	Preparation of the instrument by sending organizers including the selected color standards.
4	<b>Data Transfer</b>	Take readings with the instrument, download to smart-chart and save in a database.
5	<b>Data Analysis</b>	Data analysis of measurements in various reports: Test report for single vehicles up to trend reports over time.
6	<b>Configuration</b>	General program settings such as language, database setup, organizer management and data backup are defined.
7	<b>Software Version</b>	Will be up to date after download and installation. Please check in regular intervals if an update is available on our website. Usually updates take place twice a year.
8	<b>About / License</b>	With installation a 30 days trial period starts. Afterward the software is to be licensed. It also allows to return licenses in order to change over to a new PC.
9	<b>User Group</b>	Allows to login to a specific smart-chart user group. Details see <b>Configuration &gt; User groups</b> .

# 2

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## Software Installation

## 2.1 Requirements

The target machine has to fulfill following requirements:

- Operating system: Windows® 10 1607 or later
- Hardware: i5 2.5 GHz; i9 recommended, or equivalent (x86 & x64 architecture only)
- Memory: 8 GB RAM, 32 GB recommended
- Free hard-disk capacity: 4 GB during installation
- Monitor resolution: 1920 x 1080 pixel; 4K recommended
- Interface: free USB-port

Latest details see "smart-chart installation guide" in the download archive.

## 2.2 Installation Guide

### Download and installation

1. Download the ZIP file per instrument:
  - <https://www.byk-instruments.com/en/software>
2. Extract the complete archive on your hard drive into a new folder.
3. In the extracted folder, right mouse click on the file "install.exe" and select the option "Run as administrator".
4. Follow the setup instructions on the screen.



### NOTICE

During installation full administrator rights are necessary.



## 2.3 License Activation

After download and installation, the software can be used for **30 days** free trial. Thereafter, you need to decide and register for the required software package. The standard delivery includes two licenses for the selected software package:

- smart-lab or
- smart-process

### License activation

- Before activating the license, make sure to have a reliable internet connection.
- Start smart-chart and click on "About / License" in the upper left corner of the screen.
- The license window opens and shows the license agreement.
- Connect the instrument with the computer and click on the "License" tab.
- Select the desired software by clicking on the appropriate "Validate License" button.
- In case a license is available, the button "Import Online License" appears. Click on this button, fill in the registration form and click on "Register".
- The activation of the license is shown in the upper "License Information" field.

### License transfer

If smart-chart is to be transferred to another computer, the license needs to be returned from the actual computer and activated on the new computer.

- Before returning the license, make sure to have a reliable internet connection.
- Start smart-chart and click on "About / License" in the upper left corner of the screen.
- The license window opens and shows the license agreement.
- Find the respective software license in the upper "License Information" field and click on the "Return License" button.
- A confirmation is shown that the license was successfully returned.



### NOTICE

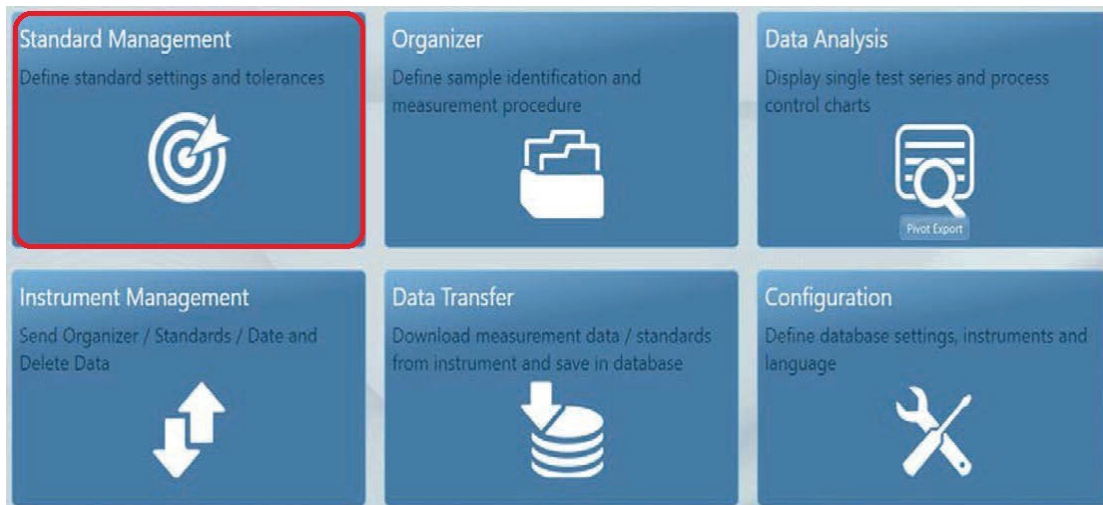
In case your computer has no internet connection, refer to file "Activate and return smart-chart license" in folder "C:\Program Files(x86)\BYKWARE\smart-chart3\Documentation".

# 3

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## Standard Management

Define your color standards including color data, statistic options and tolerance values for pass/fail analysis.



## 3.1 Color Families

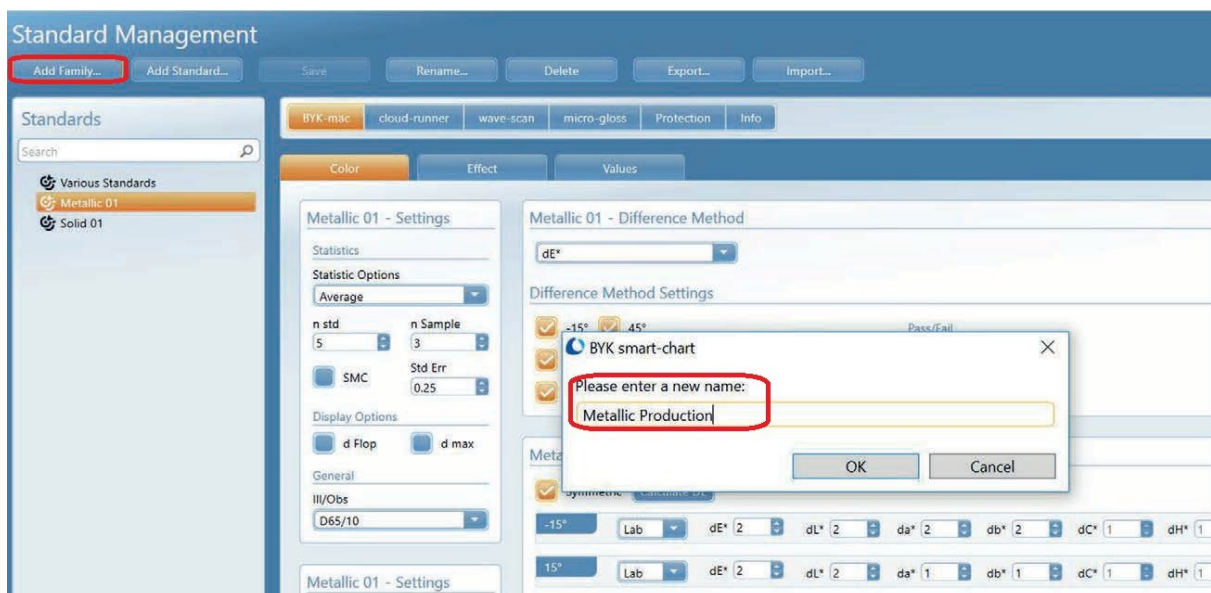
Create color families including color standards by measuring master panels.

### 3.1.1 Create Color Family

Select the instrument to be used: **BYK-mac**.

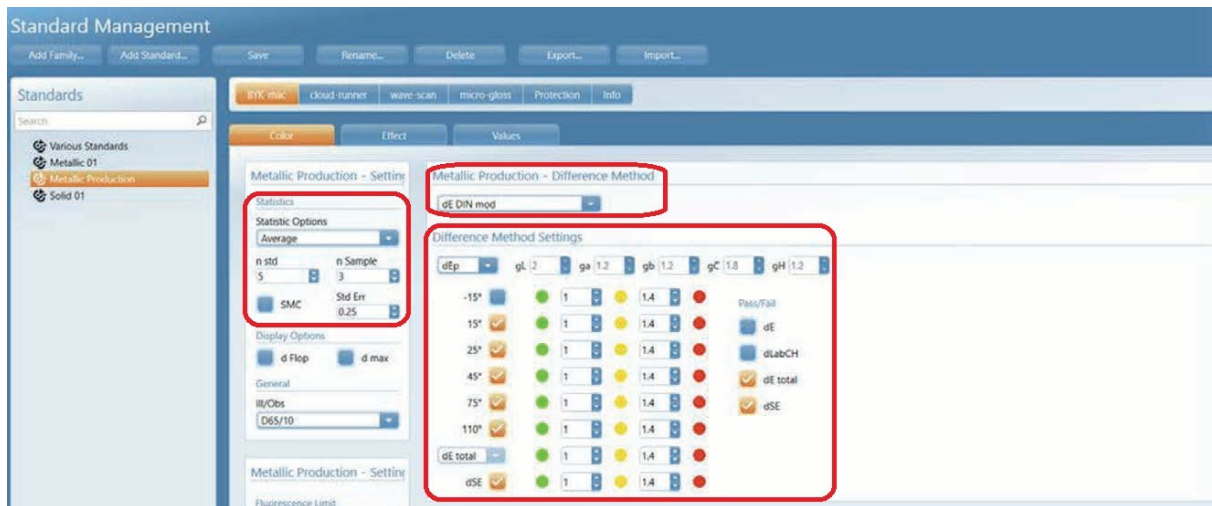
Select **Add Family** and input name e.g. "Metallic Production".

➤ A family defines the *common* measurement settings.



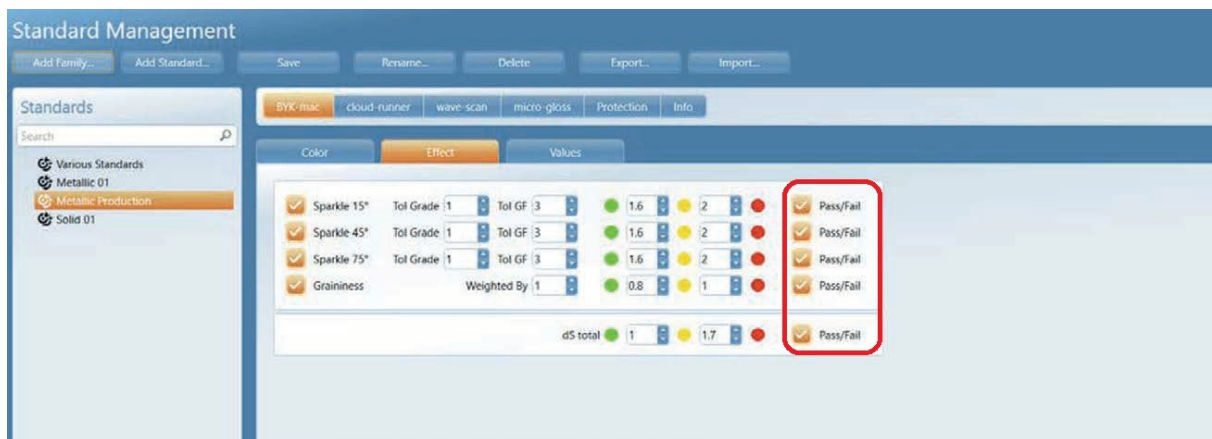
Select the tab **Color** and define:

- Color difference method
- Measurement angles: 15°/25°/45°/75°/110°
- Number of readings for standard (= master panel) and sample (= check zone)
- Statistic options



Select the tab **Effect** and activate/deactivate **Pass/Fail** for **Sparkle** and for **Graininess**.

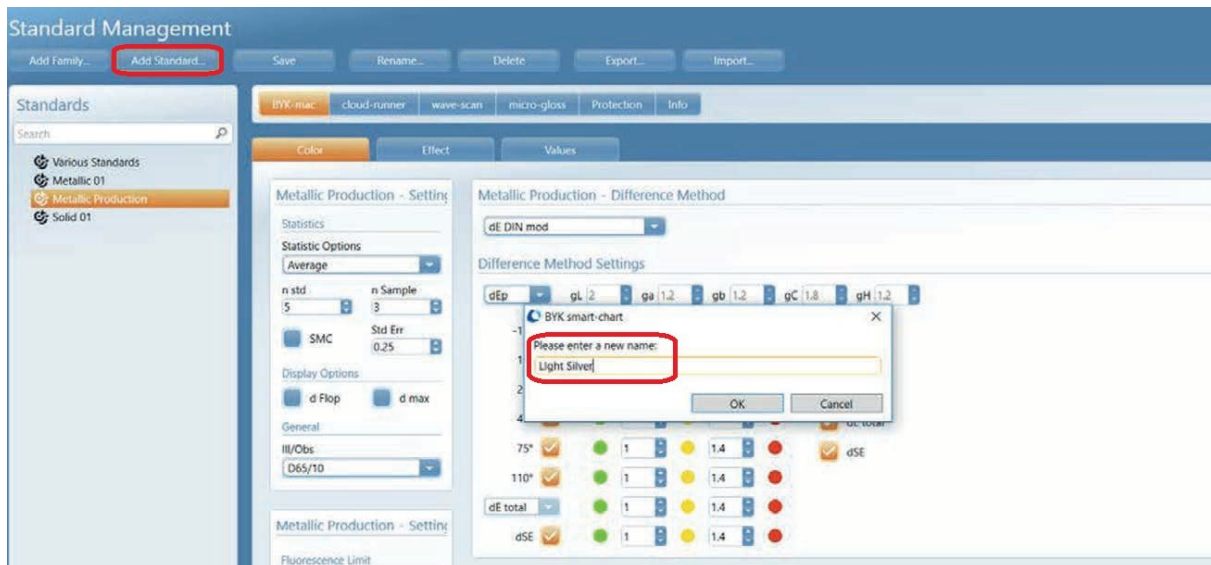
➤ If Pass/Fail is deactivated, effect parameters are measured but not used for Pass/Fail decision.



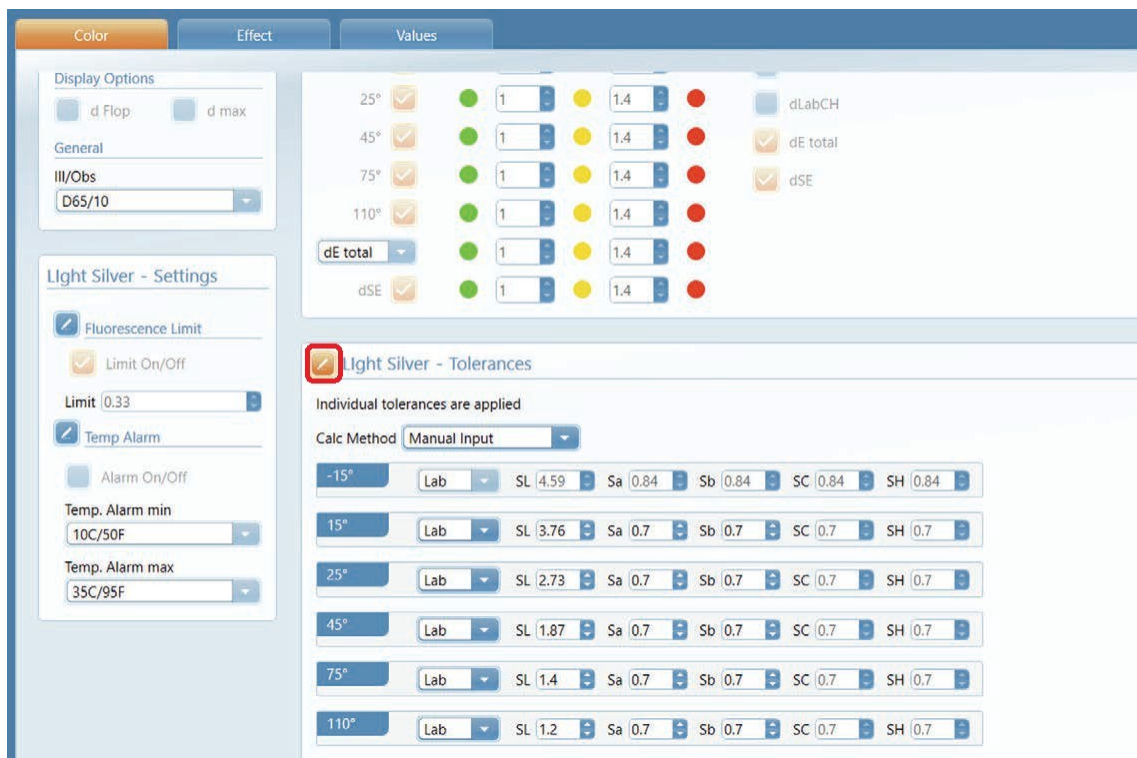
### 3.1.2 Add Color Standard

Add the color standard settings:

- Select **Add Standard** and input name, e.g. "Light Silver".



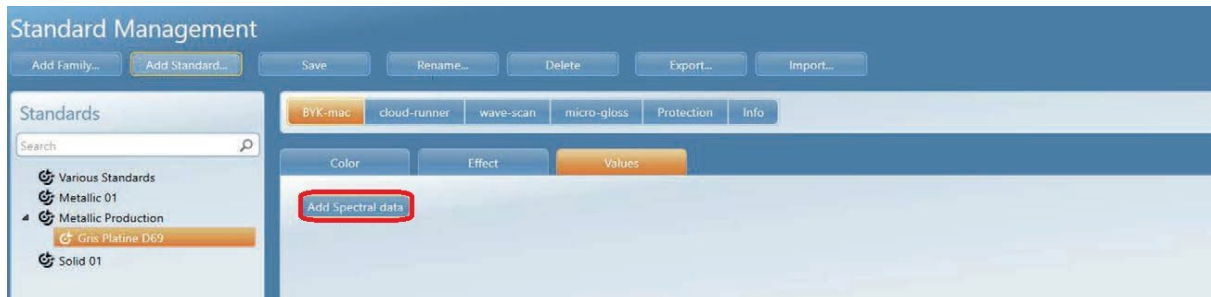
- Click on the **Edit** icon to unlock the color standard from the family and enter individual tolerances.
- The input options are dependent on the selected color difference method.



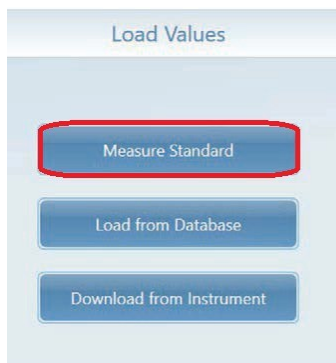
### 3.1.3 Add Spectral Data

Add the spectral data for the new color standard:

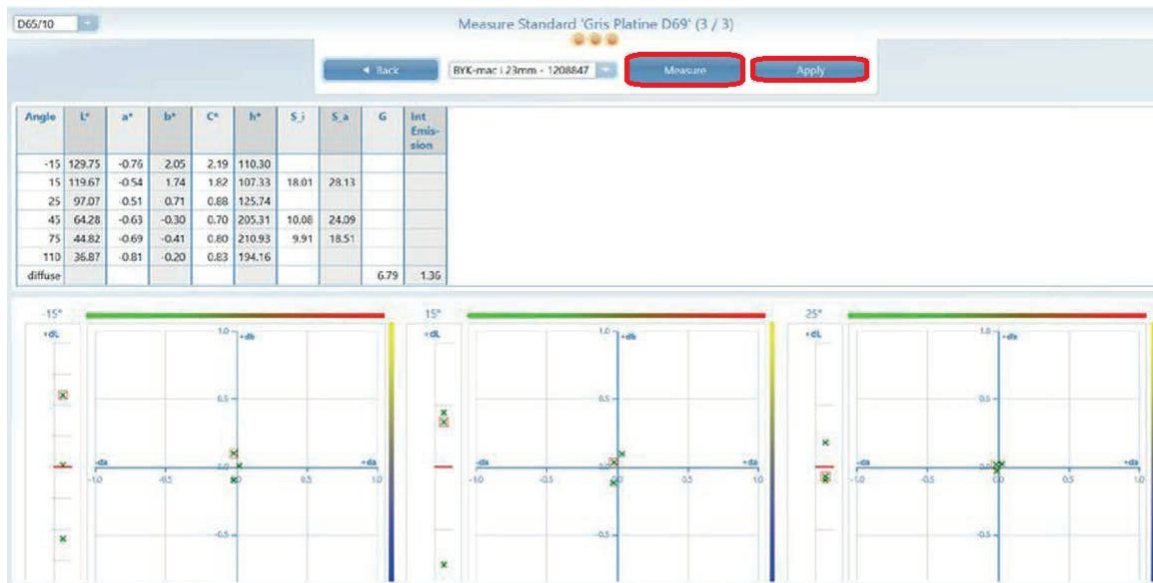
- Connect BYK-mac i with computer.
- Select tab **Values** and click on **Add spectral data** to move on to the measurement screen.



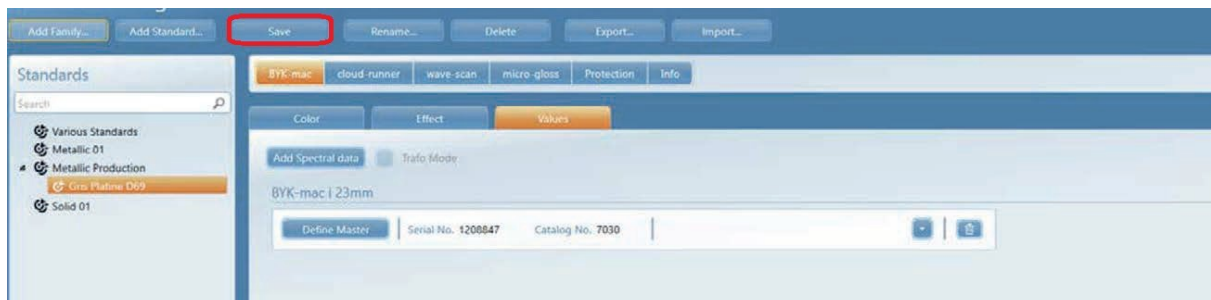
- Select **Measure Standard**.
- Make sure to select **Curvature = Flat** and proceed with **Forward**.



Place BYK-mac i on the master panel and start taking measurements by pressing either the **Operate** button on the instrument or the **Measure** button in the software.



- The data table shows the colorimetric and effect data of the last reading.
- The graph shows the individual readings compared to the average of all readings.
- Outliers can be deleted by marking the reading in the graph with the mouse and using the Delete button on the keyboard.
- Use Apply to accept the readings and the software returns to the main screen of smart-chart.



- To view the colorimetric and effect data of a standard use the **Arrow down** icon.
- To delete spectral and effect data use the **Waste bin** icon.
- To use the standard as a digital master standard click on the **Define Master** icon. This allows distributing it to other facilities or suppliers and loading it to their respective instrument.
- To save data click on the **Save** icon.

### 3.1.4 Create Color Family for Batch Approval

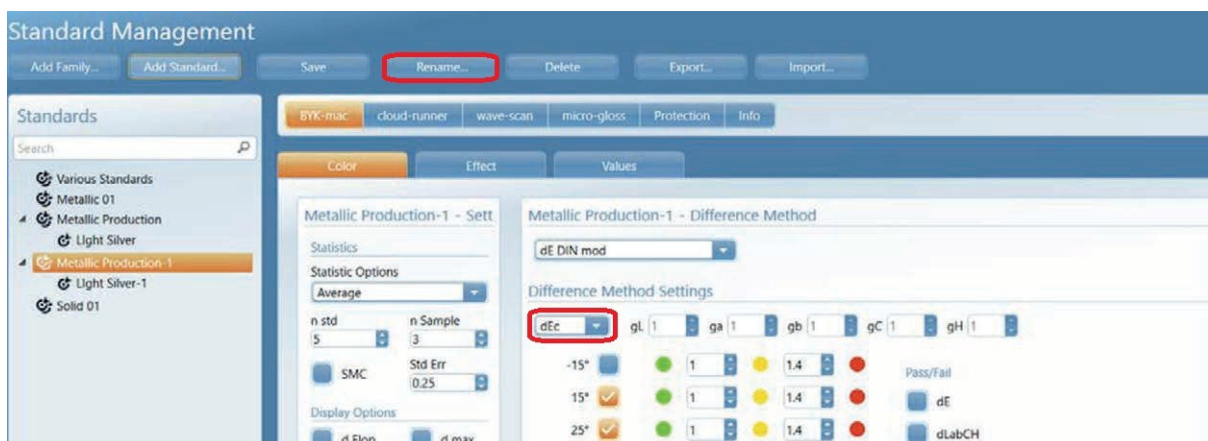
For batch approval, usually tighter tolerances are used than for production QC. Nevertheless, the same color standards meaning the same set of spectral data can be used and the color standard does not have to be re-measured again.

To create color family "Metallic Batch" from existing color family "Metallic Production":

- Right mouse click on the color family "Metallic Production" and select **Copy**.



- Right mouse click on the empty area in the blue field and select **Paste**.
- Change name of the copied color family and color standard by clicking on the **Rename** icon.
- Change the color specific tolerances to batch approval tolerances.





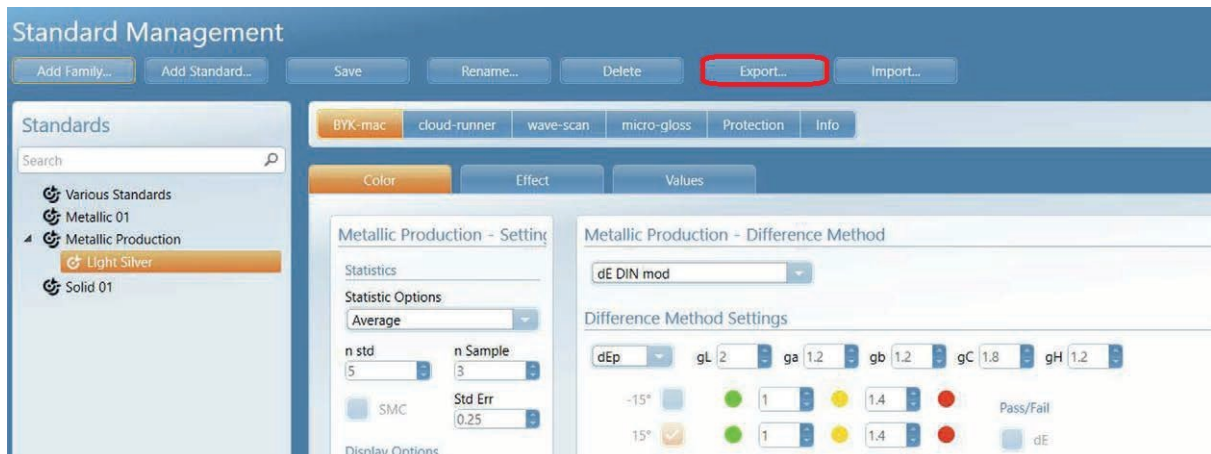
## 3.2 Digital Standards

To use digital standards save them as XML files and share with regional laboratories.

### 3.2.1 Export Digital Master

Complete color families or individual standards can be exported to be used as digital standards:

- Select the appropriate family or standards and click on the **Export** icon.
- Save the \*.xml file on a device of your choice.

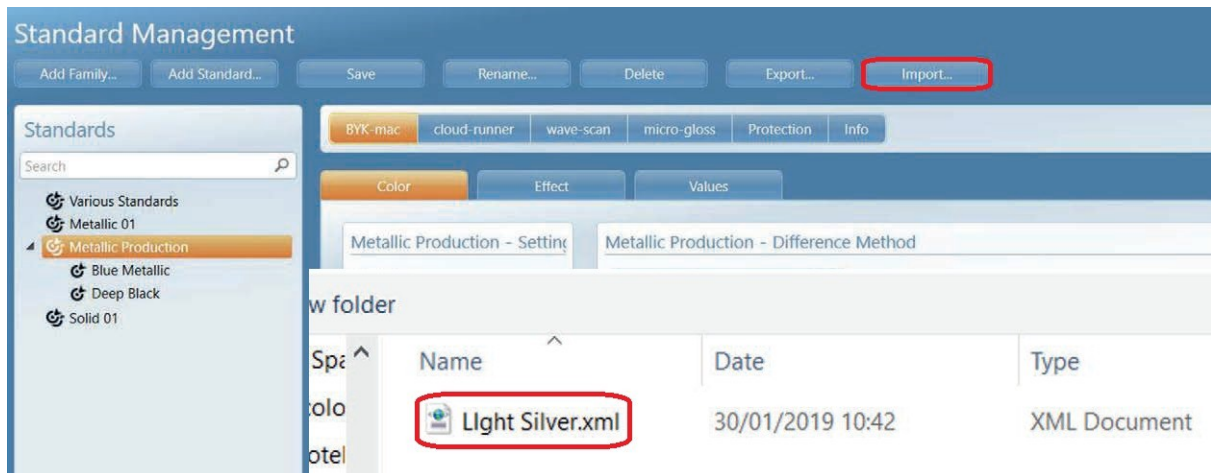


You can share digital standard \*.xml files using your shared drive, Email or USB stick.

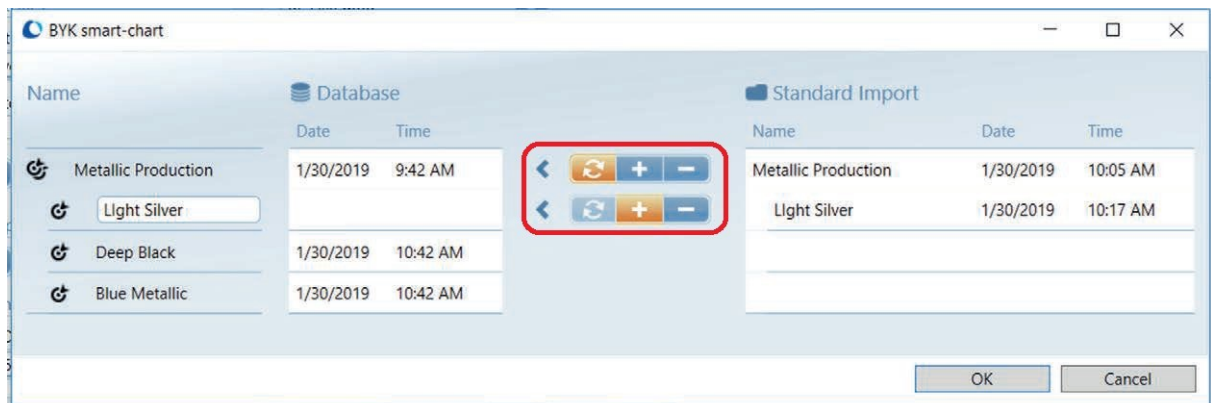
## 3.2.2 Import Digital Master

Digital standards are master standards saved as an \*.xml file. They are distributed by headquarter e.g. through Email.

- Save the files on a USB stick and transfer them to the computer on which smart-chart is installed.
- Click on **Import** and select the appropriate folder and file on your computer.



- A dialog box opens to set specific import options. Standard families and standards can be updated (double arrow), created new (+) or deleted from import (-).



# 4

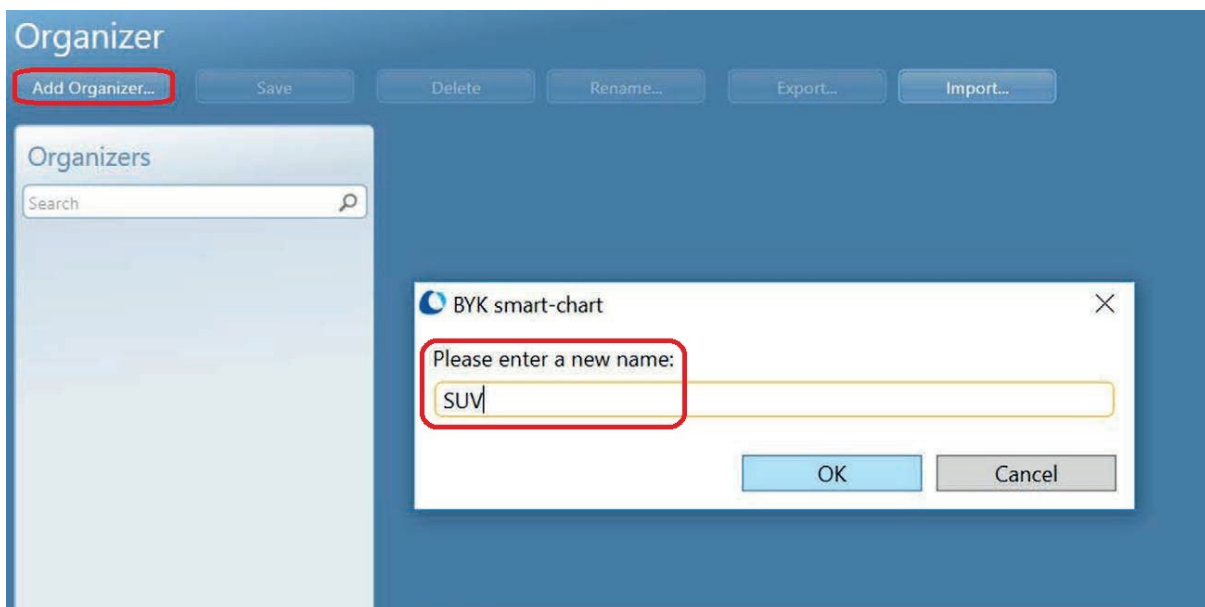
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## Organizer Measurement

An organizer includes all car models with the same measurement procedure.

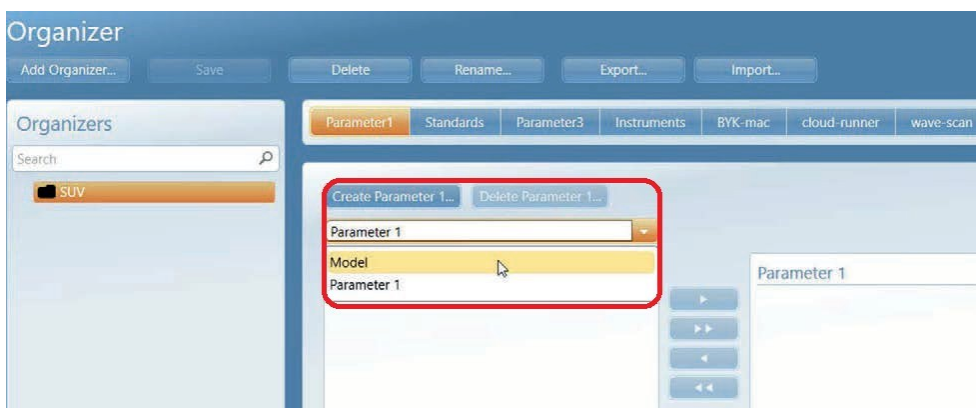


- Select **Add Organizer** and input name, e.g. "SUV".

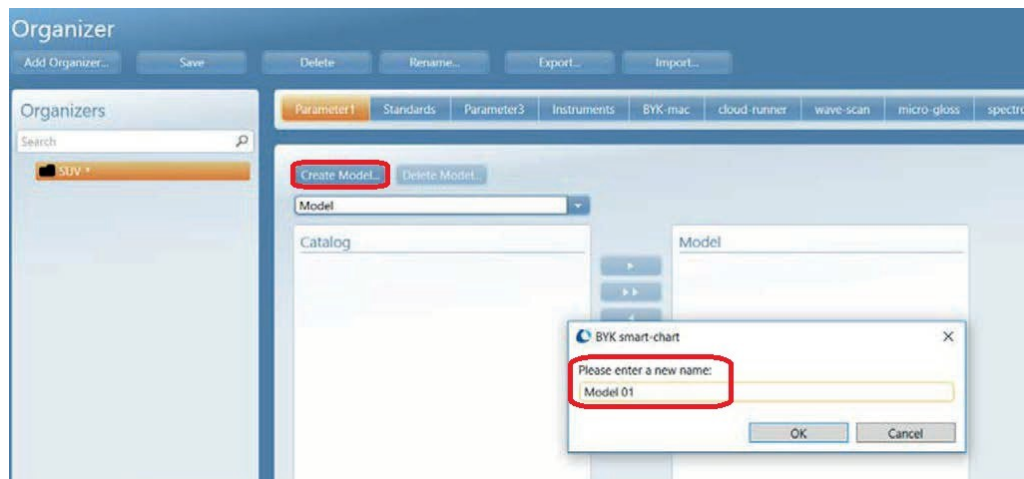


- An organizer defines all parameters for clear sample identification.
- Model – Color – Paint line – Check zones.
- For each parameter a specific catalog with multiple entries can be assigned.
- The default name of the catalog is **Parameter 1 - 5**.
- Application specific names can be assigned in the module [Configuration](#)<sup>47</sup>.

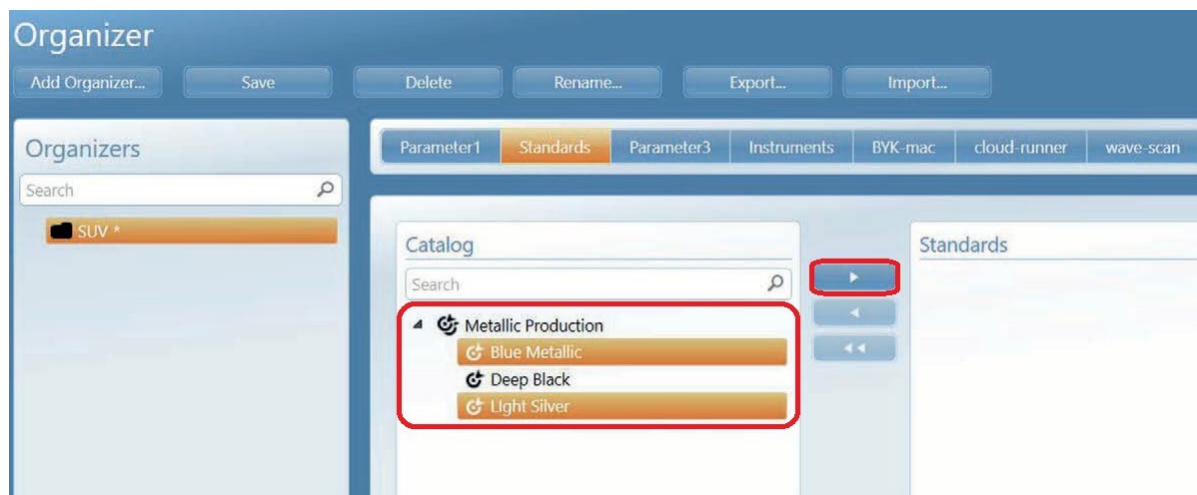
Select catalog **Model** for **Parameter 1** by using the drop down box.



- Create a new model by clicking on the **Create Model** icon and input the model name.
- The new model is automatically selected in the organizer.

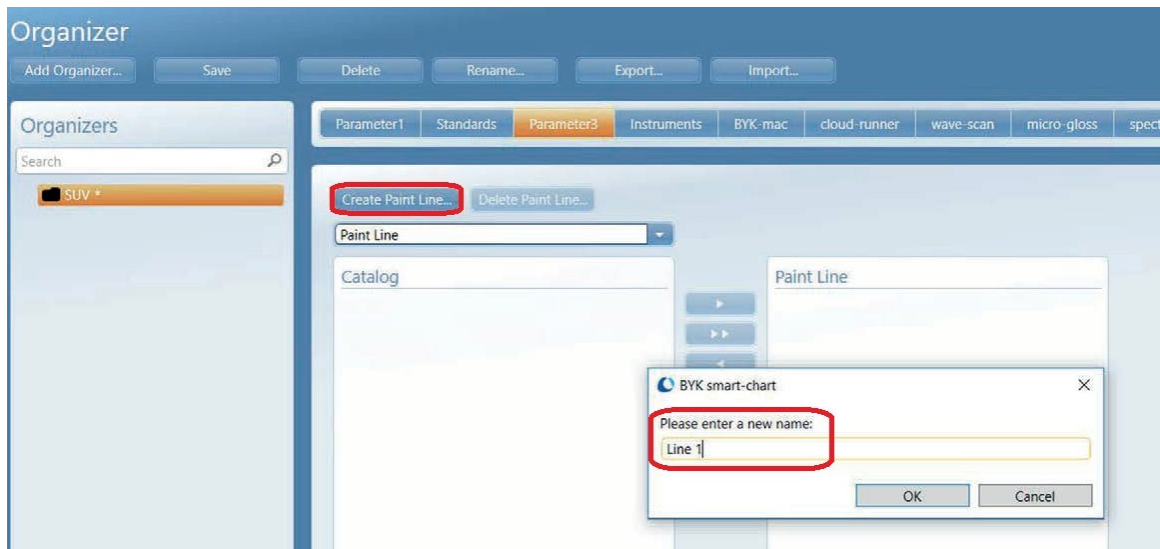


- Click on **Standard** and select all colors that are used for this model by either selecting the complete color family or individual colors.
- To select them, click on the **Arrow right** icon.

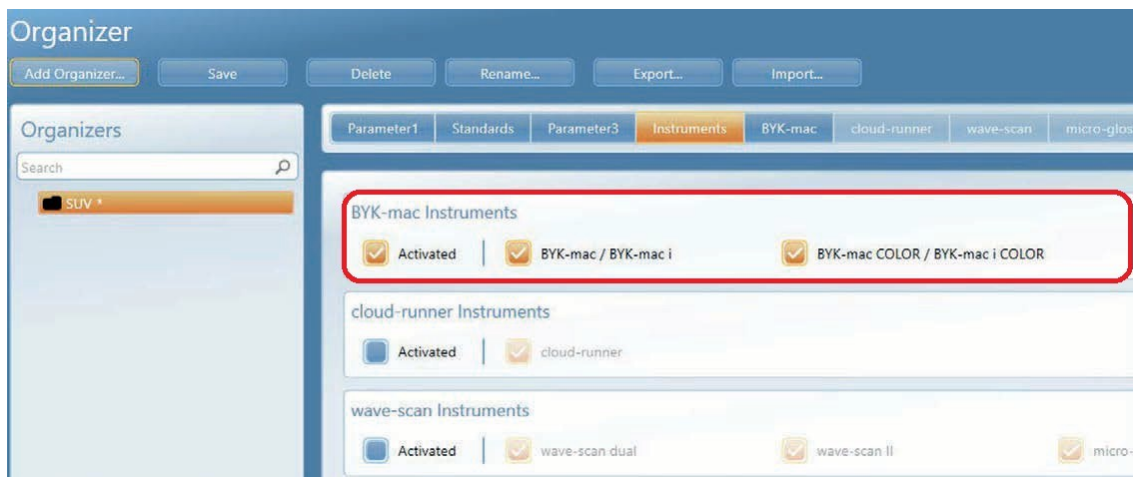


**Note:** When new colors are added, the organizer needs to be updated and resent to the instrument.

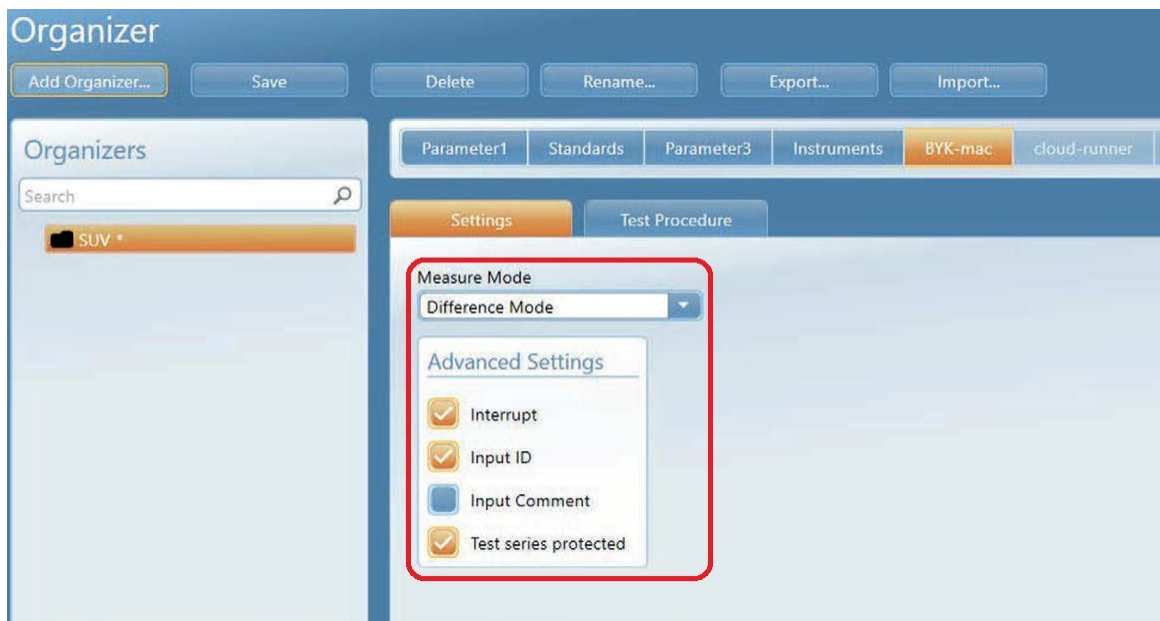
- For **Parameter 3** select catalog **Paint line**.
- Create a new paint line by clicking on the **Create Paint Line** icon and input the name.
- The new paint line is automatically selected in the organizer.



- Under **Instruments** all instruments the organizer is going to be sent must be selected: Activate the option **BYK-mac / BYK-mac i**.



- Continue with defining the **Settings** for the BYK-mac i.

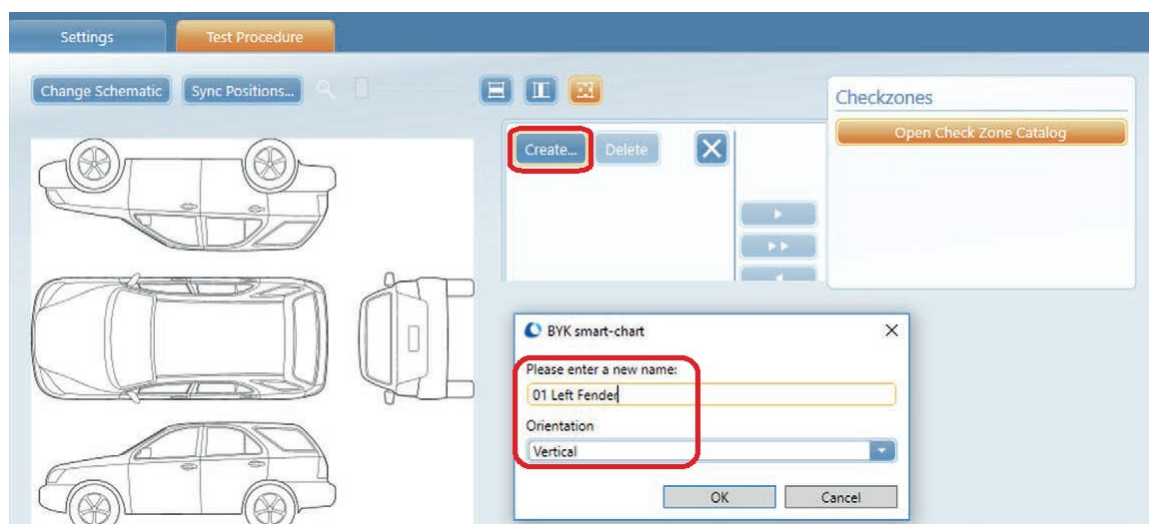


<b>Measure Mode</b>	<p><b>Absolute Mode:</b> Only the values measured actually on the sample are displayed on the device.</p> <p><b>Difference Mode:</b> The difference values compared to the standard are displayed on the device.</p> <p><b>Pass/Fail Mode:</b> The difference values and the Pass/Fail results based on the standard's limits are displayed.</p>
<b>Interrupt</b>	Allows skipping test zones or ending a test series before all given test zones have been measured.
<b>Input Serial No.</b>	An individual identification for each test series must be entered on the device, e.g. the "part number".
<b>Input Comment</b>	A comment must be entered on the instrument for each test series, e.g. "New coating batch".
<b>Test series protected</b>	Organizers with the associated measurements cannot be deleted on the device, but only via the smart-chart software.

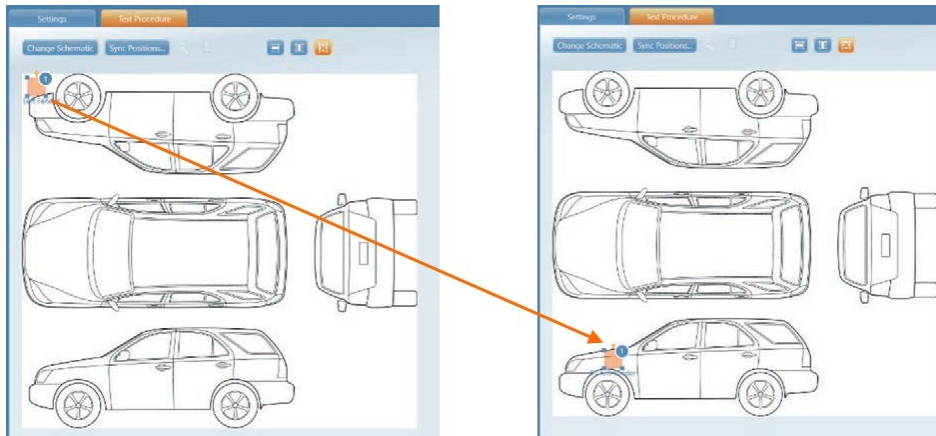
- In the next step define the **Test Procedure**.
- Select the appropriate **Car Schematic** from the list.



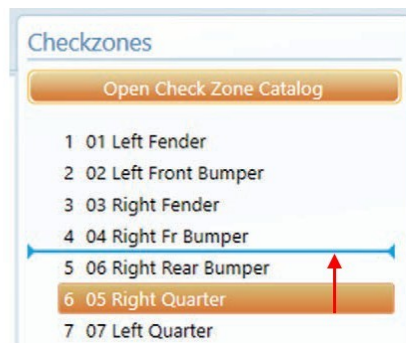
- **Create** check zones: Enter a name and select the appropriate orientation (vertical / horizontal). This will make sure that the correct tolerances from Standard Management are applied. Highly important for the wave-scan instrument.



- A rectangular symbol with the sequence number appears in the upper left corner. Drag & Drop it with the mouse to the right position on the vehicle and adjust the direction of illumination.



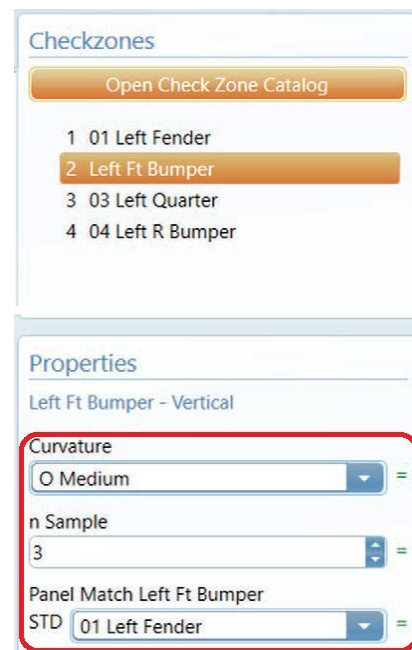
- To change the measurement sequence, click on the check zone name with the mouse and Drag & Drop it to the desired position.



For each check zone individual properties need to be defined.

- **Curvature:** Defines the sensitivity of the instrument against tilting. Recommended curvature settings are low or medium (see table below). The selected curvature has to be evaluated and checked by measuring a car body (model dependent).
- **N Sample:** Defines the number of readings for the check zone.
- **Panel Match:** Two adjacent check zones can be paired up, which allows in [Data Analysis](#)<sup>34</sup> to display a differences between the adjacent panels.

**Note:** Standard is always the body panel.





Symbol	Sample Curvature	Example	
I	Flat	Test Panel	4 Pins < 0.1 mm
)	Low curvature	Hood	3 Pins < 0.1 mm; 1 Pin < 0.3 mm
O	Medium curvature	Bumper	3 Pins < 0.3 mm; 1 Pin < 0.9 mm
o	High curvature	Mirror Housing	3 Pins < 0.6 mm; 1 Pin off
Off			Pins deactivated, but it is ensured that no ambient light will enter aperture

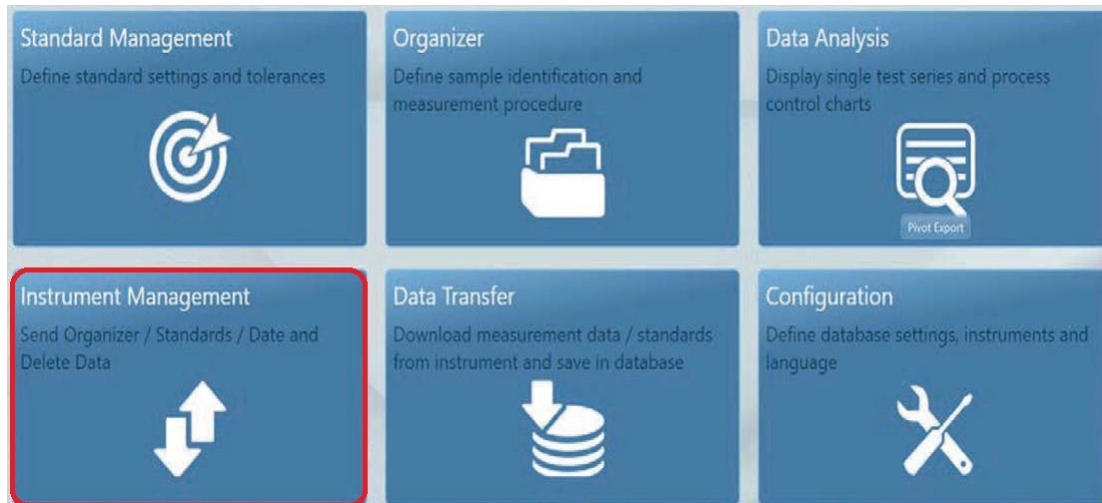
To save the organizer click on the **Save** icon.

# 5

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## Instrument Management

Send the organizer(s) and standards(s) to the instrument.



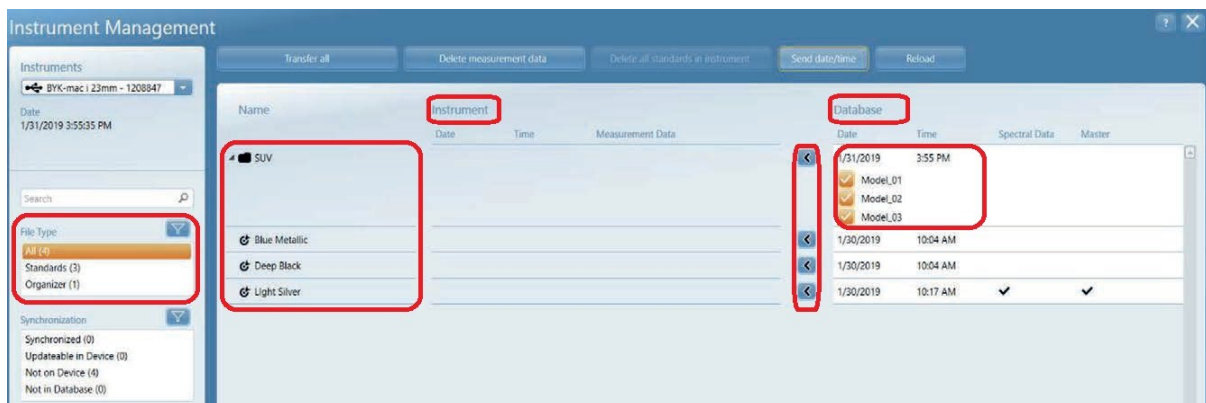
## 5.1 Transfer Data

The **Instrument Management** window shows following data columns:

- **Name:** Lists the files / objects depending on the selection on the left side.
- **Instrument:** Shows the organizers and standards saved in the instrument.
- **Database:** Shows all files stored in the database.

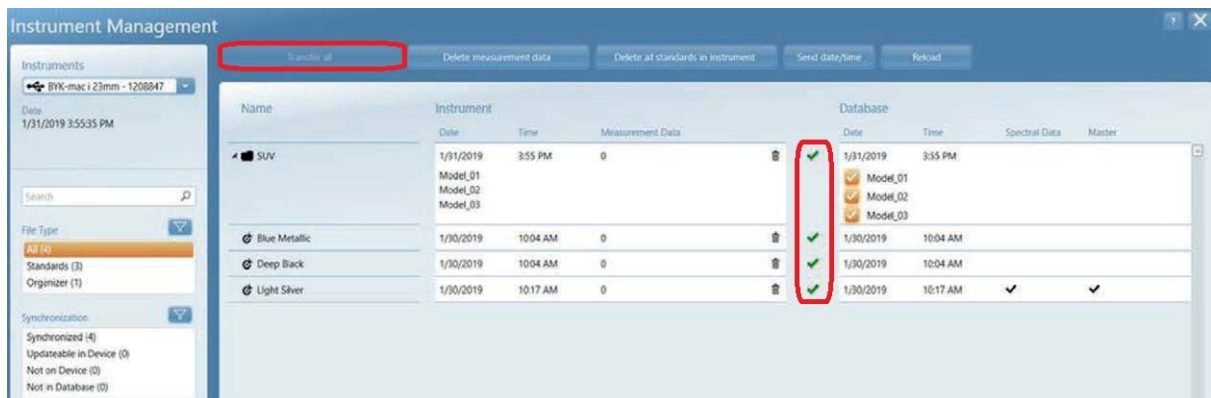
**Note:** Standards are marked by a target symbol - Organizers by a folder symbol.

On the left side you are able to **filter** which type of files to be displayed.



- Clicking on the **arrow in front of the organizer name** displays all models that are included in this organizer. Individual models can be deselected.
- Organizers can be sent to the instrument by clicking on the **arrow buttons pointing to the instrument column**.
- A red arrow indicates that some parameters are not defined in the organizer and the organizer cannot be sent to the instrument. Please review the settings in the [Organizer](#) <sup>20</sup> module.
- Sending the organizer automatically transfers all standards that are selected in the organizer.

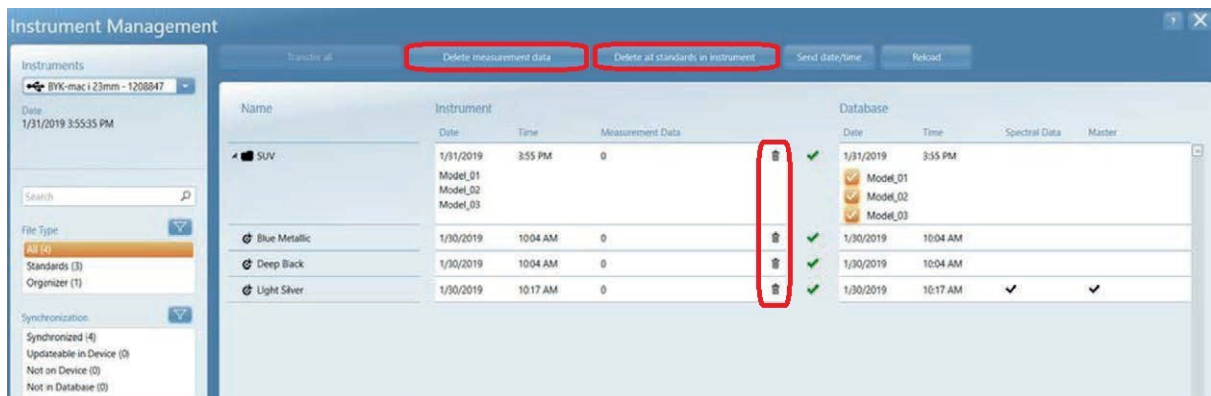
After successful transfer a green check mark appears and the organizer/standards are now also shown in the **Instrument** column.



## 5.2 Delete Data

In case you did not delete data in the instrument at time of data transfer to the measurement database it can be done afterward:

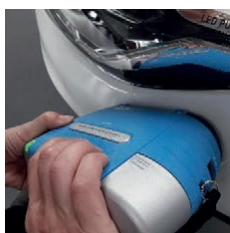
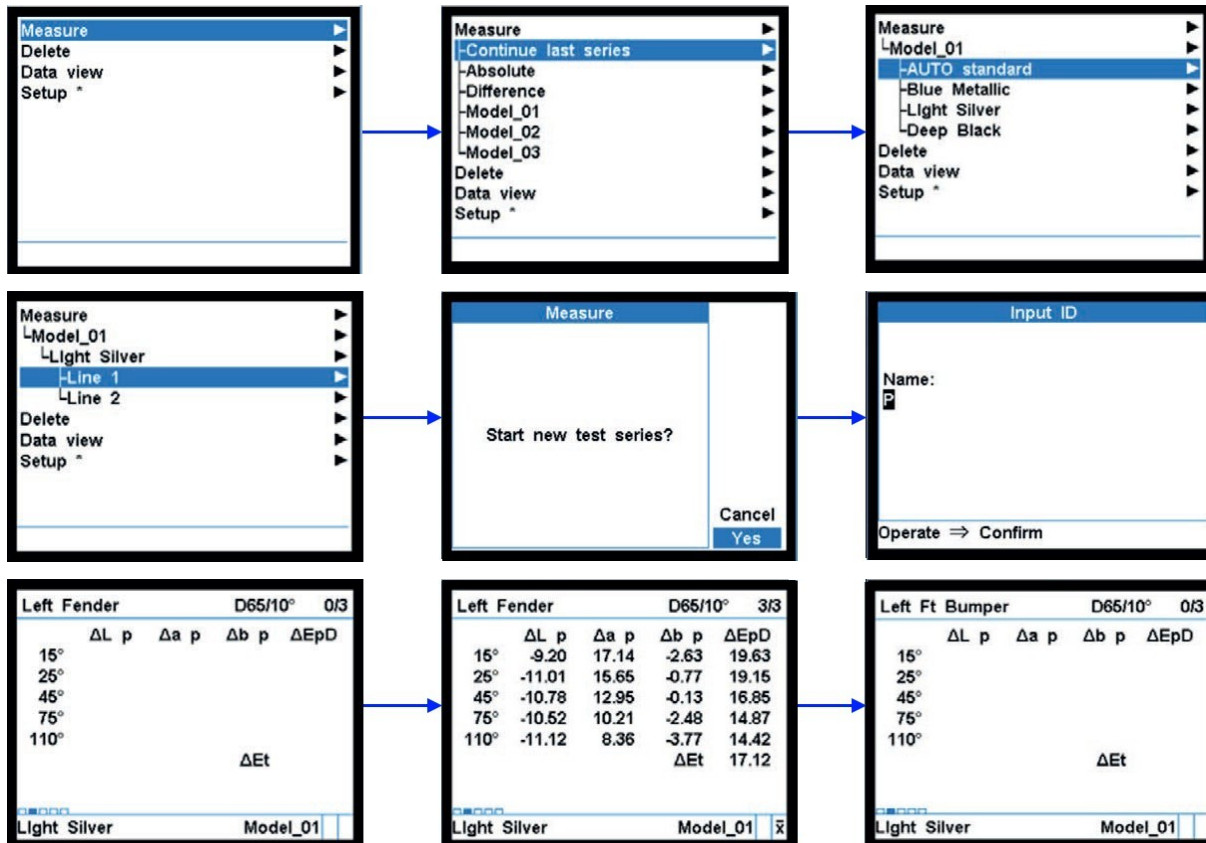
- Use **Delete measurement data** to delete measurements of vehicles.
- Use **Delete all standards** in the instrument to delete all standards.
- To delete individual standards or organizers in the instrument please use the **Waste bin** icon behind the respective entry.



### 5.3 Instrument Operation

Use the display on the BYC-mac i to navigate through the menu in the instrument:

- Scroll wheel **Mode**: Press to switch on, show context menu during measurement or activate selected function. Scroll to select function.
- Push button **Operate**: Switch on, activate selected function and measure.



Press **Operate** button on the instrument to move to next check zone.



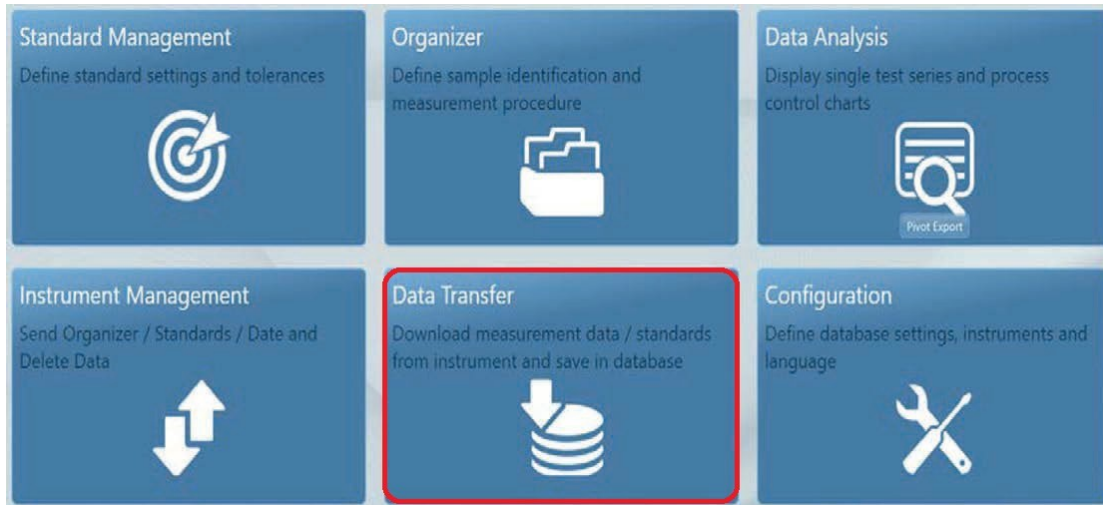
After the last check zone the instrument returns to the main menu.

# 6

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## Data Transfer

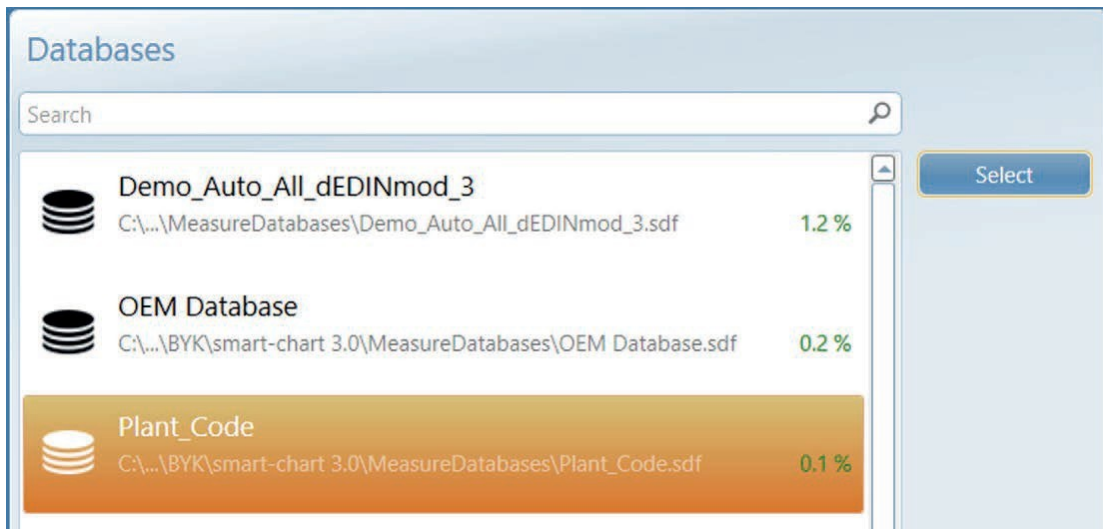
The measurement data can be transferred from the instrument to the software and saved to a database.



Connect the instrument to the PC and open the module **Data Transfer**.

## 6.1 Open Database

Select the database to which measurements are to be saved. If there is only one database, this dialog is skipped and the database is automatically selected.



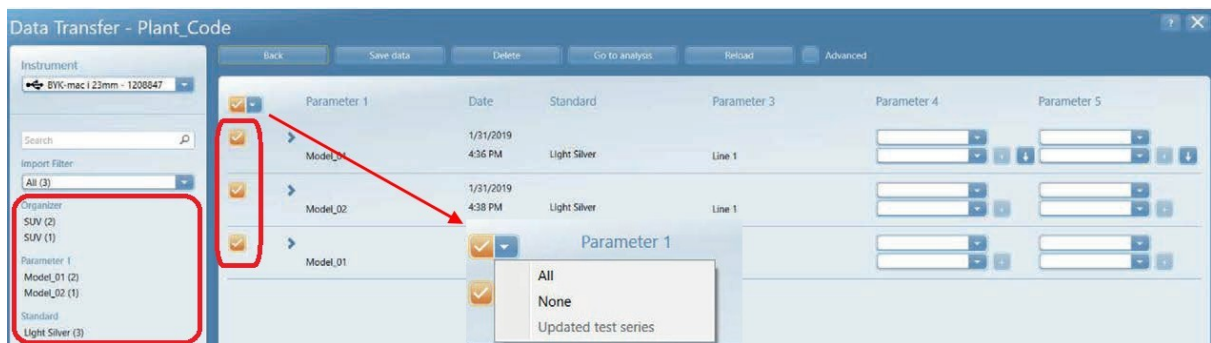
The percentage after the database name indicates "how full" it is.

## 6.2 Transfer Results

As default, all vehicles saved in the instrument memory are selected. By clicking on the **orange check box** you are able to deselect specific test series.

Or you can use the **check box in the header** to select **All** or **None**. The option **Updated test series** is only available for the instrument **spectro2guide**.

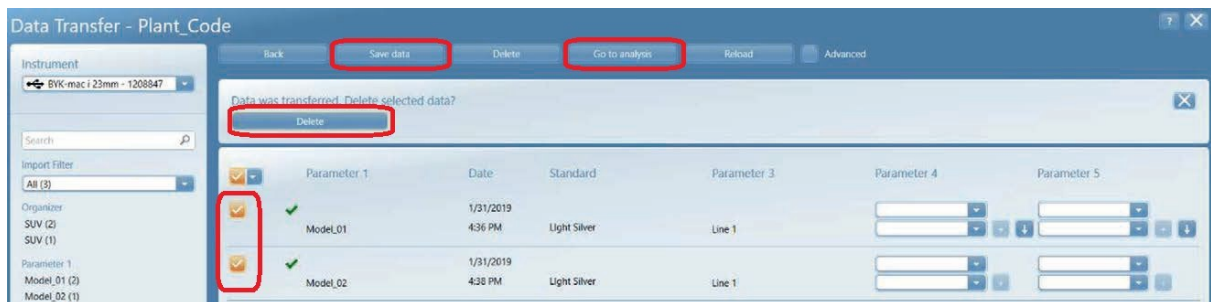
The **Filter** option on the left side allows to select the displayed data by **Organizer – Model – Standard**.



To save the readings click on the **Save Data** icon. The saved files are shown with a check mark.

To delete data in the instrument, please select the option **Delete**.

Press **Go to Analysis** to continue directly with data analysis.



### NOTICE

If you forget to delete the measurement data in the device, this can be done later in the module **Instrument Management** module.



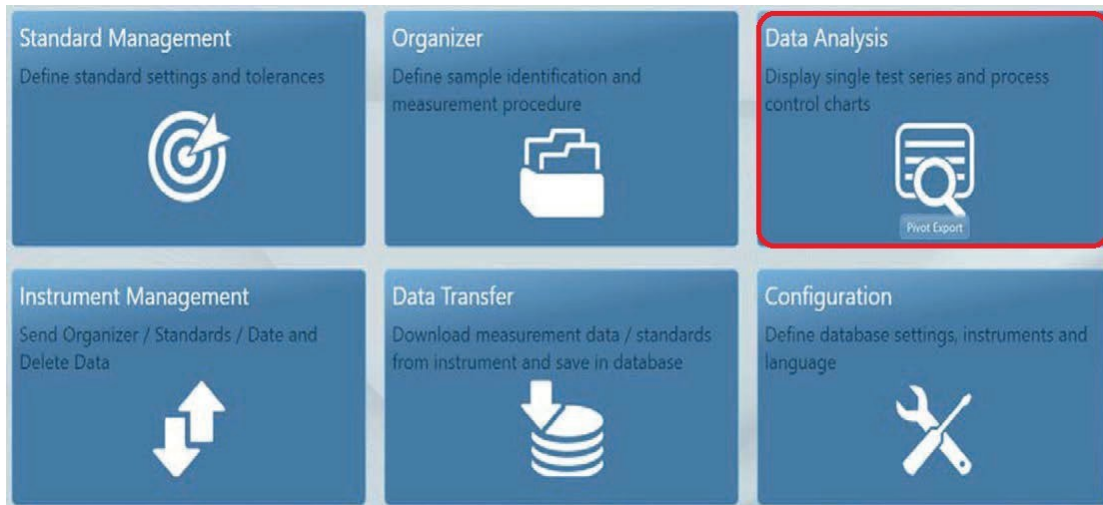
# 7

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## Data Analysis

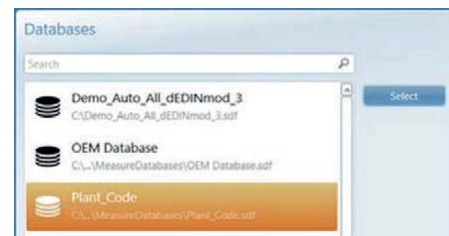
Analyze measurement data in various reports:

- [Test Report](#)<sup>35</sup>: Used for single vehicles.
- [Trend Report](#)<sup>40</sup>: Used to control process stability over time.



Select database:

- If only one database is available, the screen aside is skipped and the database is automatically selected.

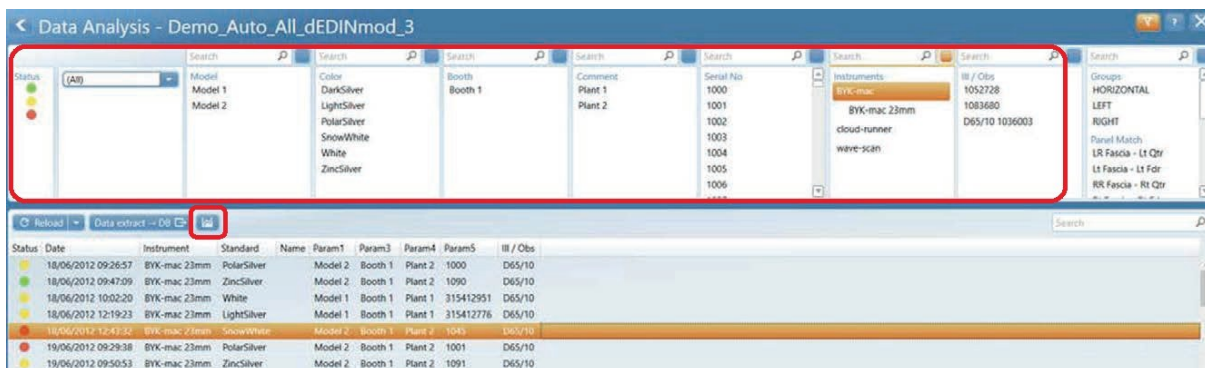


## 7.1 Database List

The top window allows to select test series from the database which will be listed in the lower area after pressing the **Reload** button.

The following **filter criteria** are available:

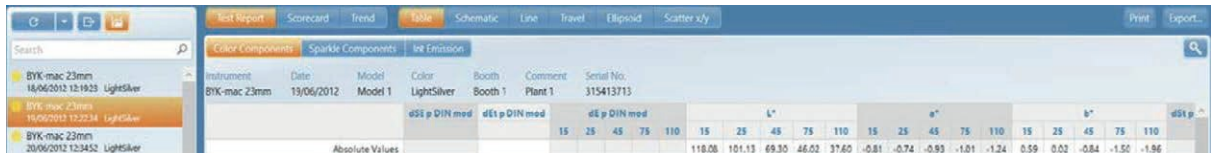
- Status: Pass – Warning – Fail; based on the tolerances defined in Standard Management.
- Date: Input time range or use predefined range, e.g. "Today", "This Week".
- Parameter 1 – 3: As defined in the organizer.
- Parameter 4 – 5: As input on the instrument.
- Instruments and Check Zones / Panel Matches



- To activate a filter criteria: Click on the respective item; it will be highlighted. To deactivate click again.
- The square above each filter field allows to select and deselect all items.
- To select the individual reports with graphical display click on the **Graph** icon.

## 7.2 Test Report

Measurement data of a single vehicle is shown. It is the ideal report for color harmony reviews. Different graphical displays are available.



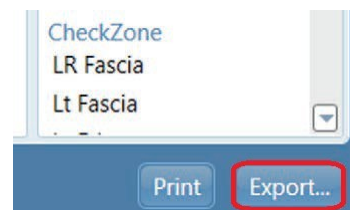
- Select one vehicle in the **List** and click on the required graph.

## 7.3 Data Table

The data table shows the numerical measurement values. Differences between check zones and master standard (**Match to Standard**) as well as differences between two adjacent check zones as defined in the organizer (**Panel Match**) are displayed.

Instrument		Date	Model	Color	Booth	Comment	Serial No.	L*												a*												b*											
BYK-mac 23mm		09/07/2012	Model 1	LightSilver	Booth 1	Plant 1	315426733	dSE p DIN mod				dEt p DIN mod				dE p DIN mod				L*				a*				b*															
								15	25	45	75	110	15	25	45	75	110	15	25	45	75	110	15	25	45	75	110	15	25	45	75	110											
Absolute Values								118.08	101.13	69.30	46.02	37.60	-0.81	-0.74	-0.93	-1.01	-1.24	0.59	0.02	-0.84	-1.50	-1.96																					
Limit fail / Tolerance ±								2.00	1.70	1.70	1.70	1.70	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00						
Limit warning / Scaling factor								1.40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00				
Checkzone	Date	Status	dSE p DIN mod	dEt p DIN mod	dE p DIN mod				dL p DIN mod				da p DIN mod				db p DIN mod																										
<b>Match to Standard</b>								15	25	45	75	110	15	25	45	75	110	15	25	45	75	110	15	25	45	75	110																
Lt Fascia	7/9 1:06:26 PM	●	0.79	0.63	0.44	0.83	0.85	0.52	0.35	0.00	-0.24	-0.54	-0.35	-0.33	-0.08	-0.11	0.00	0.08	0.08	-0.43	-0.79	-0.65	-0.38	-0.06																			
Lt Qtr	7/9 1:06:26 PM	●	0.59	0.55	0.64	0.72	0.39	0.33	0.59	0.43	0.53	0.12	-0.31	-0.53	0.01	-0.08	-0.06	0.03	0.01	-0.48	-0.48	-0.36	-0.12	-0.25																			
Rt Fdr	7/9 1:06:26 PM	●	0.95	0.92	0.91	0.83	0.65	1.01	1.14	0.73	0.56	-0.43	-0.98	-1.07	0.22	0.08	0.05	0.07	0.03	-0.49	-0.61	-0.48	-0.22	-0.39																			
RR Fascia	7/9 1:06:26 PM	●	1.08	0.93	1.09	0.96	0.74	0.87	0.95	1.00	0.64	-0.18	-0.80	-0.94	-0.08	-0.09	0.03	0.14	0.15	-0.43	-0.71	-0.72	-0.32	0.01																			
Lt Fdr	7/9 1:06:26 PM	●	0.77	0.77	0.87	0.84	0.30	0.71	0.93	0.85	0.77	-0.11	-0.71	-0.89	0.02	-0.04	-0.02	0.03	0.04	-0.21	-0.33	-0.28	-0.09	-0.26																			
LR Fascia	7/9 1:06:26 PM	●	0.68	0.55	0.53	0.54	0.58	0.56	0.55	0.50	0.37	-0.21	-0.49	-0.54	-0.07	-0.09	0.02	0.10	0.10	-0.14	-0.39	-0.54	-0.25	0.09																			
Rt Qtr	7/9 1:06:26 PM	●	0.76	0.71	0.65	0.80	0.58	0.57	0.89	0.26	0.32	-0.10	-0.50	-0.79	0.17	0.12	0.07	0.07	0.04	-0.57	-0.72	-0.56	-0.28	-0.40																			
Rt Fascia	7/9 1:06:26 PM	●	0.92	0.78	0.82	1.08	0.95	0.53	0.50	-0.03	-0.29	-0.32	0.06	0.14	-0.02	-0.10	0.03	0.06	0.08	-0.61	-1.02	-0.89	-0.52	-0.25																			
<b>Panel Match</b>								15	25	45	75	110	15	25	45	75	110	15	25	45	75	110	15	25	45	75	110																
Lt Fascia - Lt Fdr	7/9 1:06:26 PM	⇒	0.90	0.76	0.88	1.11	0.57	0.46	0.59	-0.85	-1.02	-0.43	0.36	0.55	-0.11	-0.07	0.02	0.05	0.04	-0.22	-0.45	-0.37	-0.28	0.20																			
LR Fascia - Lt Qtr	7/9 1:06:26 PM	⇒	0.61	0.31	0.35	0.19	0.39	0.24	0.35	0.07	-0.16	-0.33	-0.19	0.00	-0.08	-0.01	0.08	0.07	0.09	0.33	0.09	-0.17	-0.13	0.34																			

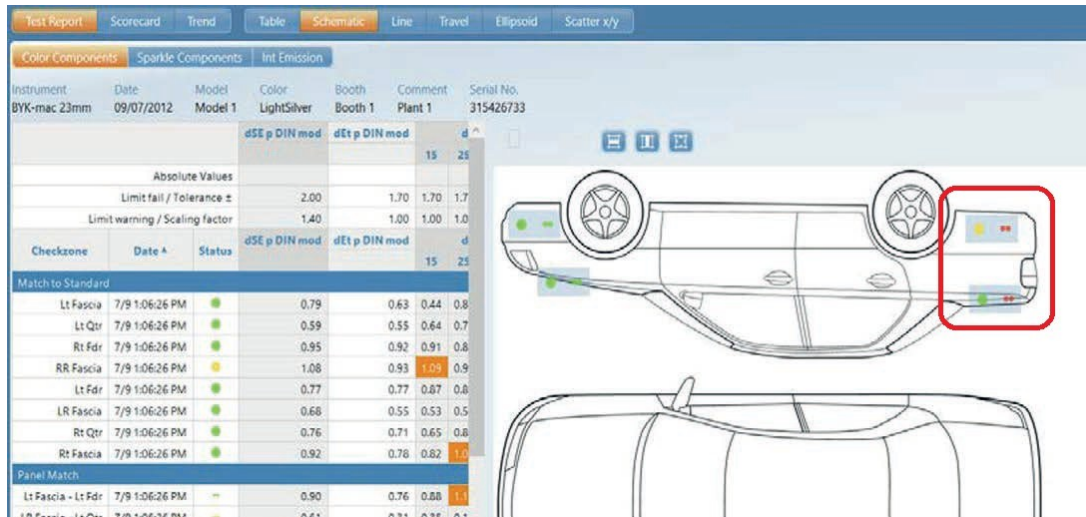
- A traffic light symbol is assigned to each check zone and panel match.
- Values out of tolerance are highlighted in yellow or red according to the Pass/Fail definition in Standard Management.
- If individual color components are out of specification, the data is colored to indicate the direction of the deviation, e.g.  $\Delta b^*$  negative  $\rightarrow$  value is highlighted in blue.
- The information of the data table can be exported to Excel by clicking on the **Export** icon in the right corner above the data table.



## 7.4 Car Schematic

Clicking on the **Schematic** icon displays the schematic of the car as defined in the organizer with traffic light symbols:

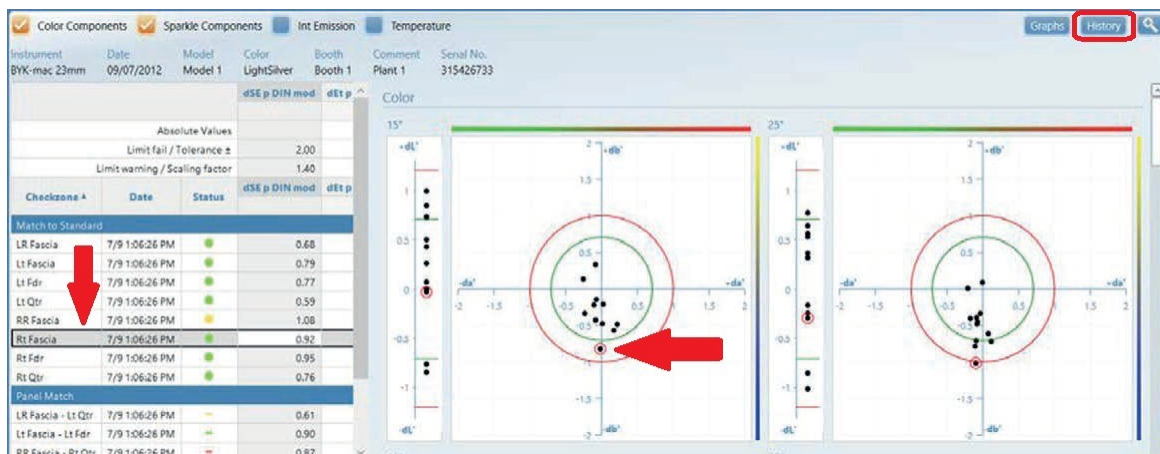
- Single dots: Used for comparing check zone to standards.
- Double dots: Used for panel match.



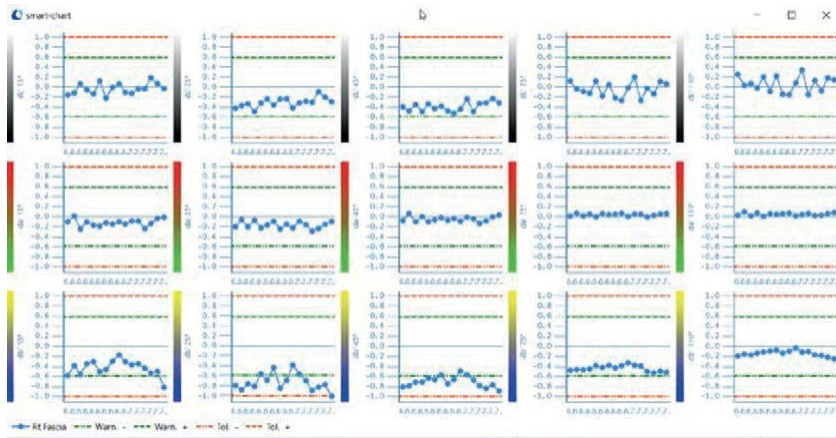
## 7.5 Scatter Plot

Clicking on the **Scatter x/y** icon displays the CIELAB graph including the tolerances as defined in Standard Management.

- Selecting a check zone in the data table automatically borders the respective dot in the graph in red.



By clicking on **History** the trend of the maximum last 20 vehicles of the same Model – Color – Paint Line is displayed. The layout of the graph is according to the definition in **Line Graph**.



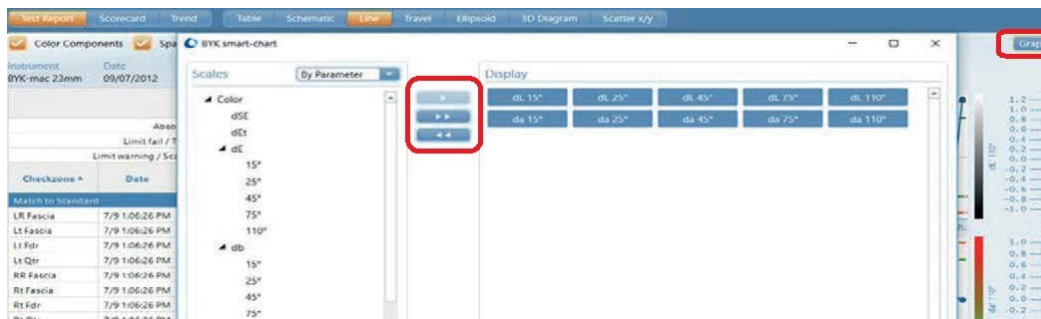
## 7.6 Line Graph

Clicking on the **Line** icon displays line graphs including the tolerances as defined in Standard Management.



The scales to be shown in the graph can be selected with the icon **Graphs**. Select the required scales by using the **Arrow** buttons.

- The order of the scales can be changed by using left mouse click and drag & drop.
- Individual scales can be deselected with the **Waste bin** icon which appears during mouse rollover.



## 7.7 Travel Graph

Clicking on the **Travel** icon displays a graph showing the flop for each check zone. The individual measurement angles are shown in different colors.

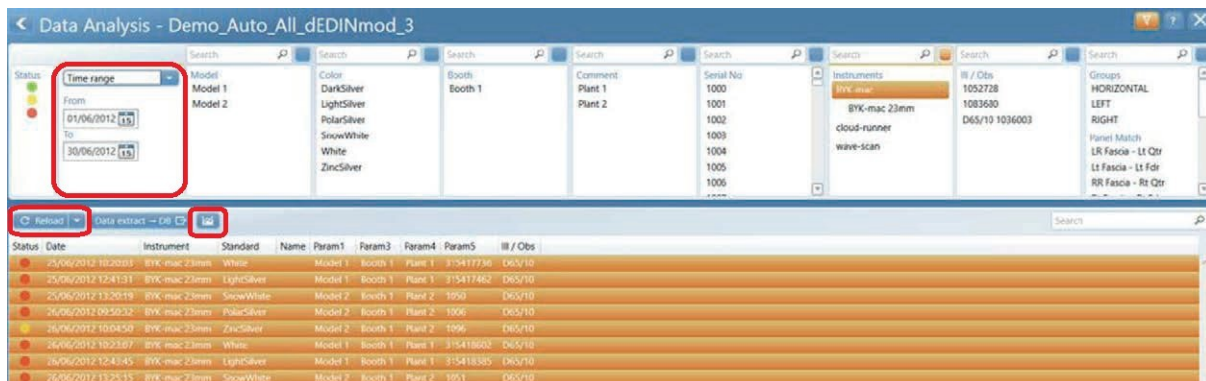
- Red and green tolerance lines as defined in Standard Management are displayed as well.



## 7.8 Scorecard Report

This report gives an overview how the individual colors are running over time. It can be used as a summary report for upper management as it will easily detect colors where actions have to be taken.

- A **Scorecard Report** is usually done for all colors over a specific time range (e.g. one month).
- Activate the respective **filter criteria** in the upper part of the window and click on **Reload**.
- **Select** all test series in the **List** with the mouse, click on the **Graph** icon and select **Scorecard and Table**.



- The arrangement of data in **rows** and **columns** is defined by the blue **grouping fields** in the upper part of the table.
- To change the layout drag & drop the field to the row or column header area, or remove it to the top of the table.

- The grouping fields are related to the parameters defined in the organizer. Additional fields are available for Day, Week, Month, Angle.
- Values out of tolerance are highlighted in yellow or red according to the Pass/Fail definition in Standard Management.

	LightSilver							PolarSilver							SnowWhite				
	dSE	dEt	dE 15	dE 25	dE 45	dE 75	dE 110	dSt	dSE	dEt	dE 15	dE 25	dE 45	dE 75	dE 110	dSt	dSE	dEt	dE
- Match to Standard	0.82	0.72	0.67	0.75	0.65	0.69	0.73	0.34	0.98	0.84	0.88	0.70	0.69	0.84	0.97	0.47	1.22	1.22	
LR Fascia	0.76	0.59	0.53	0.55	0.68	0.61	0.55	0.48	0.75	0.71	0.84	0.50	0.57	0.68	0.88	0.22	2.36	2.36	
Lt Fascia	0.89	0.74	0.61	0.91	0.99	0.61	0.39	0.48	0.92	0.85	1.07	0.91	0.67	0.62	0.88	0.34	0.58	0.58	
Lt Fdr	0.90	0.89	0.95	0.91	0.53	0.88	1.06	0.14	0.71	0.66	0.73	0.66	0.50	0.68	0.68	0.26	1.01	1.01	
Lt Qtr	0.67	0.61	0.61	0.64	0.39	0.52	0.79	0.27	0.88	0.81	0.84	0.64	0.62	0.94	0.92	0.34	0.65	0.65	
RR Fascia	0.92	0.81	0.78	0.78	0.73	0.82	0.83	0.44	0.81	0.73	0.85	0.55	0.54	0.67	0.89	0.32	2.42	2.42	
Rt Fascia	0.77	0.59	0.44	0.80	0.81	0.44	0.19	0.49	2.28	1.53	1.28	1.17	1.56	1.54	1.95	1.69	0.84	0.84	
Rt Fdr	0.91	0.89	0.85	0.80	0.63	0.97	1.13	0.18	0.78	0.73	0.74	0.60	0.58	0.85	0.82	0.28	1.09	1.09	
Rt Qtr	0.70	0.66	0.61	0.59	0.41	0.67	0.92	0.23	0.73	0.66	0.71	0.52	0.50	0.79	0.75	0.30	0.77	0.77	
- Panel Match	0.83	0.63	0.71	0.69	0.41	0.46	0.69	0.51	0.91	0.54	0.56	0.60	0.47	0.42	0.51	0.72	1.75	1.75	
LR Fascia - Lt Qtr	0.72	0.41	0.47	0.30	0.42	0.25	0.47	0.57	0.57	0.37	0.39	0.49	0.23	0.33	0.26	0.41	2.08	2.08	
Lt Fascia - Lt Fdr	0.90	0.75	0.82	1.04	0.53	0.50	0.69	0.49	0.63	0.40	0.51	0.46	0.36	0.29	0.26	0.48	1.28	1.28	
RR Fascia - Rt Qtr	0.69	0.50	0.68	0.46	0.45	0.21	0.47	0.47	0.66	0.41	0.57	0.47	0.25	0.26	0.30	0.50	2.33	2.33	
Rt Fascia - Rt Fdr	1.03	0.88	0.85	0.96	0.27	0.89	1.13	0.52	1.80	0.98	0.75	0.96	1.05	0.79	1.21	1.50	1.30	1.30	

- The scales to be shown in the table can be selected with the **Filter** symbol on the blue grouping field. Select the required scales by using the **Arrow** buttons.
- The filter function is available for all selected grouping fields and allows customization of the data table.

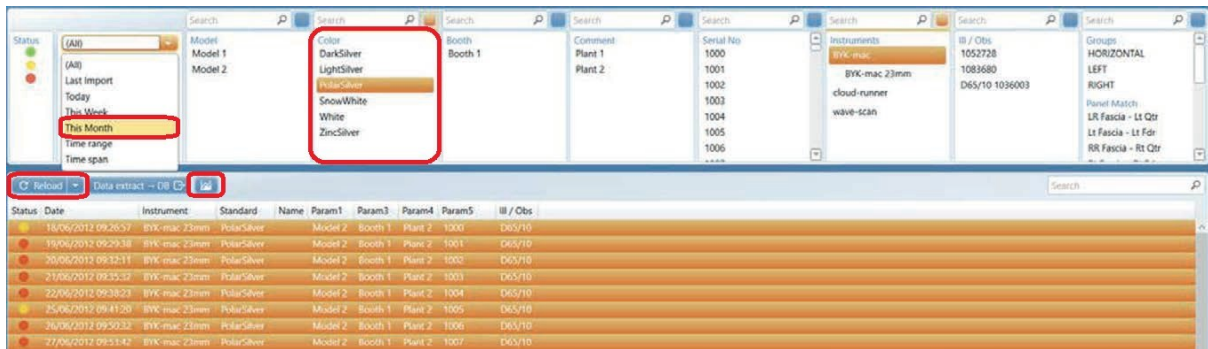
- The data can also be viewed in Scatter – Line – Travel graph by clicking on an individual cell or a complete line.

**Note:** The value in a table cell is the average of all selected test series and is highlighted in yellow or red according to the Pass/Fail definition in Standard Management.

## 7.9 Trend Report

This report shows measurement data over time (day, week, and month) or by individual. It is the ideal tool to monitor process stability.

- A Trend Report is usually done for one color over a specific time range (e.g. one month).
- Activate the respective **filter criteria** in the upper part of the window and click on **Reload**.
- **Select** all test series in the **List** with the mouse, click on the Graph icon and select **Trend** and **Table**.



- The arrangement of data in **rows** and **columns** is defined by the blue **grouping fields** in the upper part of the table.
- To change the layout drag & drop the field to the row or column header area, or remove it to the top of the table.
- The grouping fields are related to the parameters defined in the organizer. Additional fields are available for Day, Week, Month, Angle.
- Values out of tolerance are highlighted in yellow or red according to the Pass/Fail definition in Standard Management.

Color Components
  Sparkle Components
  Int Emission
  Temperature

Id
  Week
  Date
  Color
  Name
  Model
  Paintline
  Comment
  Serial No
  Angle
  Scale

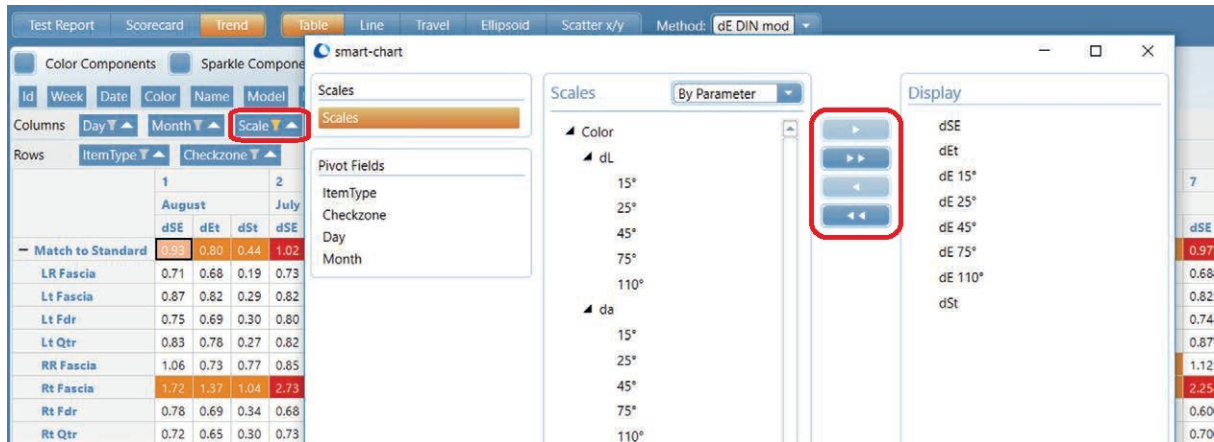
Columns: Month ↑, Day ↑

Rows: ItemType ↑, Checkzone ↑

		June										
		18										
		dSE	dEt	dE 15	dE 25	dE 45	dE 75	dE 110	dL 15	dL 25	dL 45	dL 75
-	Match to Standard	0.89	0.79	0.82	0.64	0.66	0.80	0.93	0.56	0.19	-0.45	-0.73
	LR Fascia	0.72	0.69	0.63	0.24	0.63	0.76	0.96	0.56	-0.04	-0.59	-0.76
	Lt Fascia	0.81	0.78	1.00	0.80	0.55	0.59	0.87	0.46	0.20	0.01	-0.40
	Lt Fdr	0.74	0.67	0.76	0.65	0.52	0.71	0.70	0.50	0.39	-0.30	-0.67
	Lt Qtr	0.84	0.78	0.83	0.73	0.64	0.84	0.84	0.61	0.38	-0.43	-0.74
	RR Fascia	0.76	0.74	0.84	0.51	0.56	0.74	0.96	0.55	0.04	-0.43	-0.70
	Rt Fascia	1.96	1.38	1.25	1.05	1.42	1.34	1.73	0.63	-0.26	-1.28	-1.30
	Rt Fdr	0.62	0.60	0.57	0.61	0.52	0.66	0.64	0.45	0.38	-0.23	-0.55
	Rt Qtr	0.68	0.66	0.72	0.54	0.45	0.77	0.73	0.69	0.47	-0.34	-0.75
-	Panel Match	0.78	0.50	0.47	0.57	0.47	0.35	0.52	-0.01	-0.42	-0.25	-0.12
	LR Fascia - Lt Qtr	0.56	0.41	0.29	0.60	0.36	0.32	0.42	-0.05	-0.41	-0.16	-0.01
	Lt Fascia - Lt Fdr	0.45	0.28	0.32	0.31	0.34	0.23	0.18	-0.04	-0.19	0.31	0.22
	RR Fascia - Rt Qtr	0.45	0.34	0.51	0.49	0.11	0.08	0.23	-0.14	-0.43	-0.09	0.05
	Rt Fascia - Rt Fdr	1.66	0.96	0.77	0.86	1.07	0.76	1.26	0.18	-0.64	-1.04	-0.74



- The scales to be shown in the table can be selected with **Filter** symbol on the blue grouping field. Select the required scales by using the **Arrow** buttons.
- The filter function is available for all selected grouping fields and allows customization of the data table.

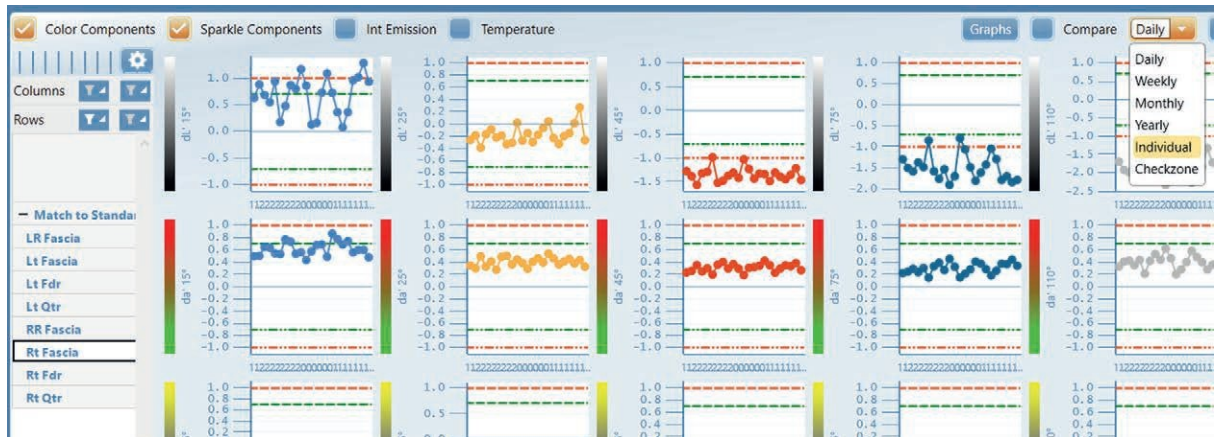


**Note:** The value in a table cell is the average of all selected test series and is highlighted in yellow or red according to the Pass/Fail definition in Standard Management.

## 7.10 Drill-In Function

The summarized data can be shown graphically in details by clicking on one or multiple rows, cells or columns.

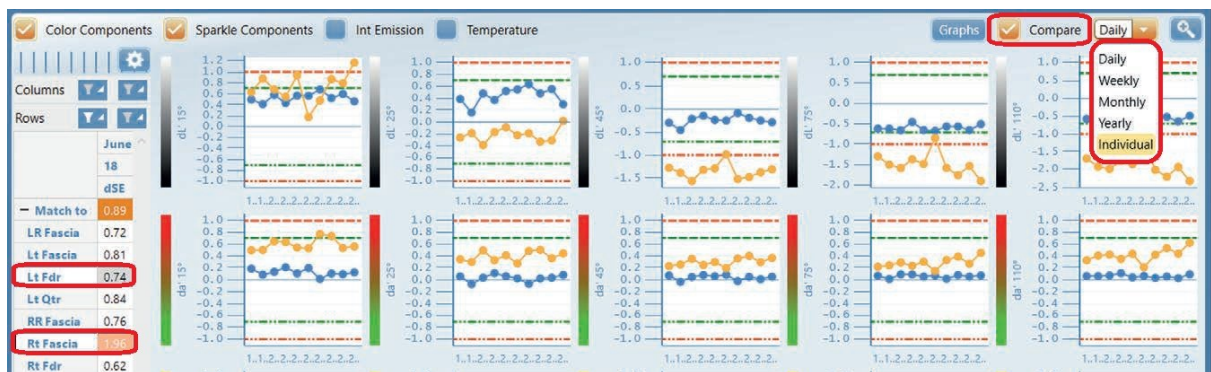
- The data on the x-axis can be selected by the drop down menu above the graph: Daily – Weekly – Monthly – Yearly – Individual – Check Zone.
  - Selecting **Individual** displays **individual vehicles** whereas **Daily, Weekly, Monthly, Yearly** still displays the **average of all vehicles** measured during this time frame.
- Buttons above the graphs allow to view the data as **Line, Travel** or **Scatter** graph.



## 7.11 Comparison of Ceck Zones

To compare different check zones press the **CTRL** button and click on the desired rows. Then activate the option **Compare**.

- The selected check zones are displayed as **different colored lines** in **Line** graph or **different colored dots** in **Scatter** plot.
- The data on the x-axis can be selected by the drop down menu above the graph: Daily – Weekly – Monthly – Yearly - Individual.
- Selecting **Individual** displays **individual vehicles** whereas **Daily, Weekly, Monthly, Yearly** still displays the **average of all vehicles** measured during this time frame
- Buttons above the graphs allow to view the data as **Line** or **Scatter** graph.



# 8

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## Data Sharing

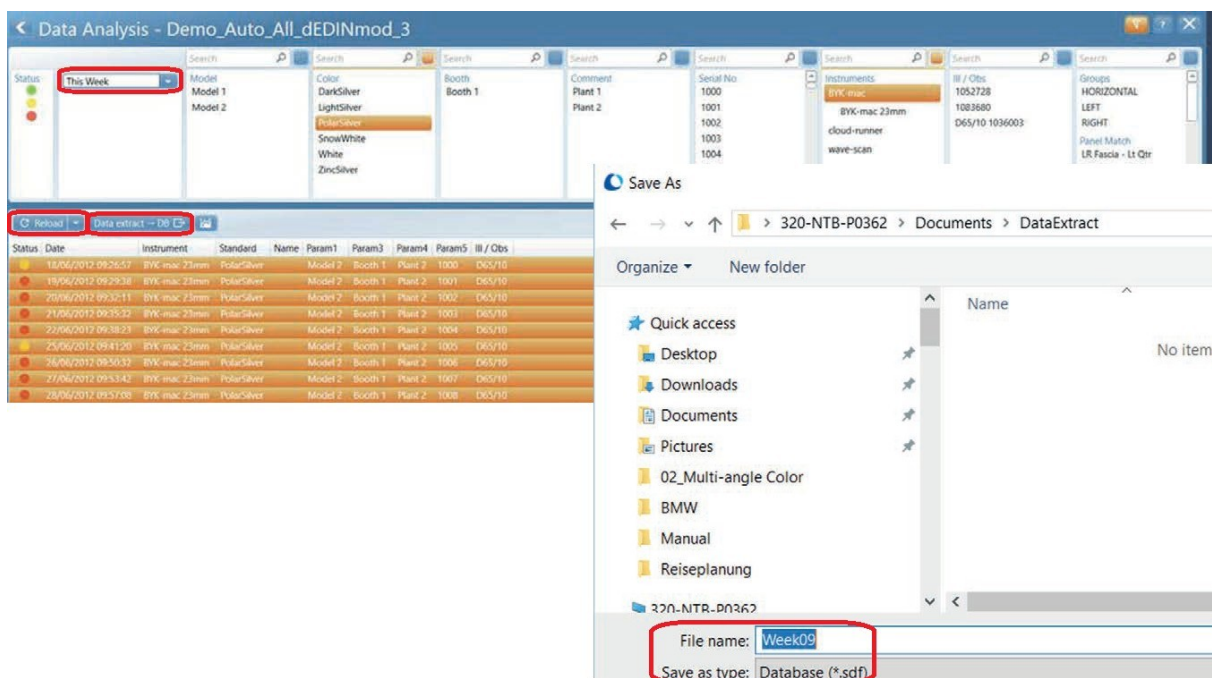
There are two possibilities to share data between headquarter – plants – suppliers:

- [Mini-DB](#)<sup>44</sup> : Create an extract of the complete database, e.g. once per week.
- [Complete](#)<sup>45</sup> : Always share the complete database.

## 8.1 Database Extract (= Mini Database)

Create an extract (= mini database):

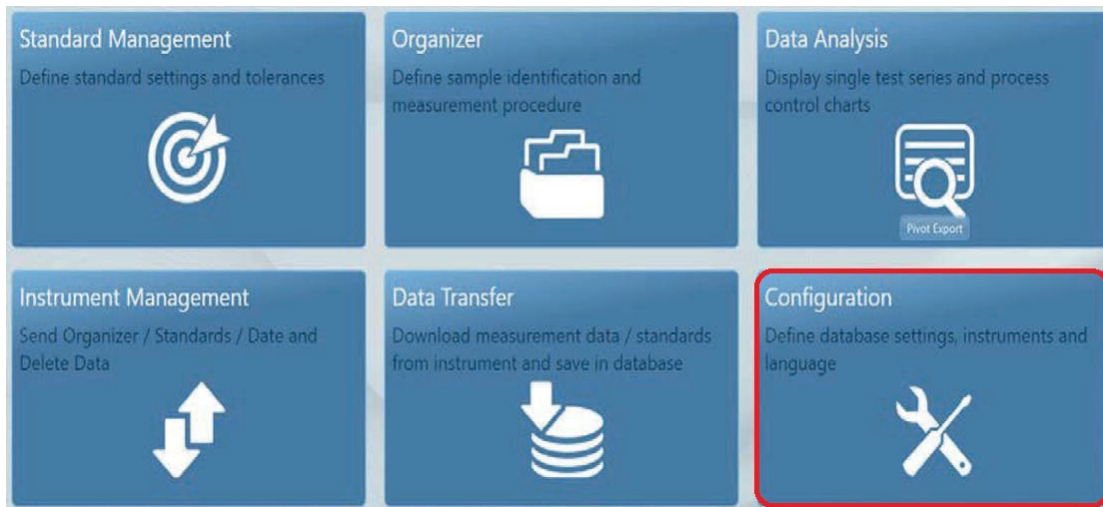
- Select the required time frame, click on **Reload** and mark all test series in the **List** with the mouse.
- Click on **Data extract > DB** and type in a name for the extracted database, e.g. calendar week "Week09".
- The mini database is saved in the regular \*.sdf format.
- Close smart-chart, open Windows Explorer and navigate to the appropriate folder.
- Create a zip archive of the \*.sdf database file to make sure it can be sent safely by email (details see [Complete Database](#)<sup>45</sup> on the next page).



## 8.2 Complete Database

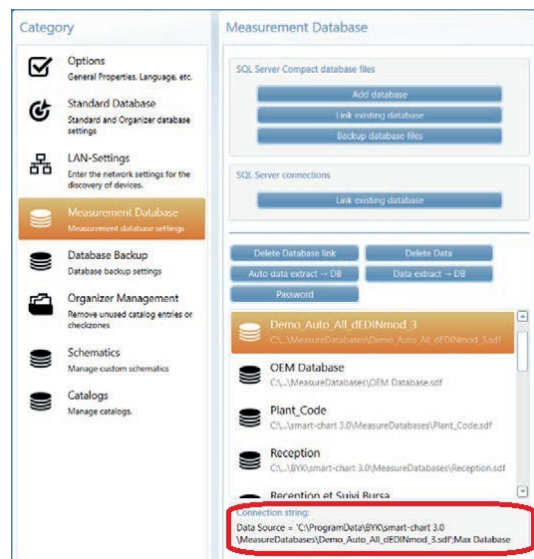
The complete database can also be shared:

- In order to find the folder where the database is stored click on **Configuration**.

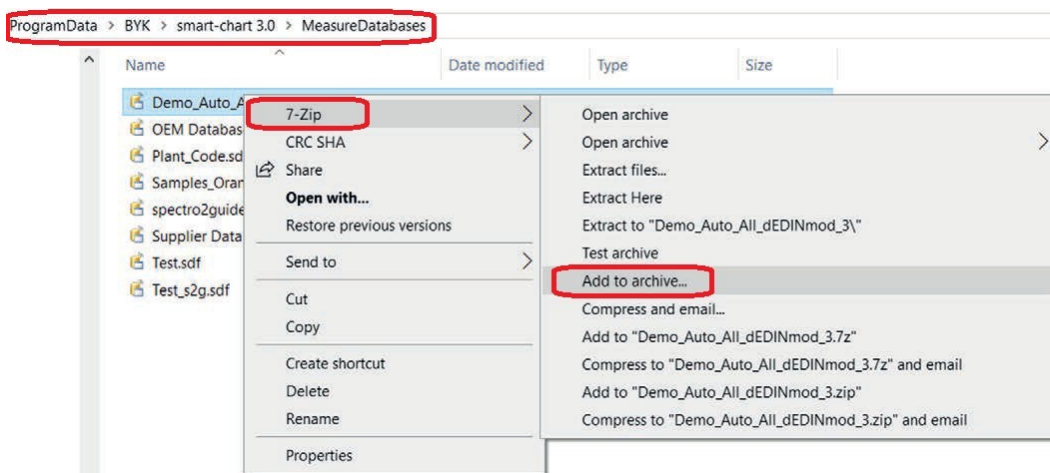


To share the complete measurement database:

- Under **Category**, select **Measurement Database**.
- All measurement databases are shown on the right side.
- Select the one you want to share.
- The folder where it is stored is displayed at the bottom as **Connection String - Data Source**.
- Close smart-chart, open Windows Explorer and navigate to the appropriate folder.
- Create a zip archive of the \*.sdf database file to make sure it can be sent safely by email.



Following example shows how to quickly create ZIP archives with "7-Zip".

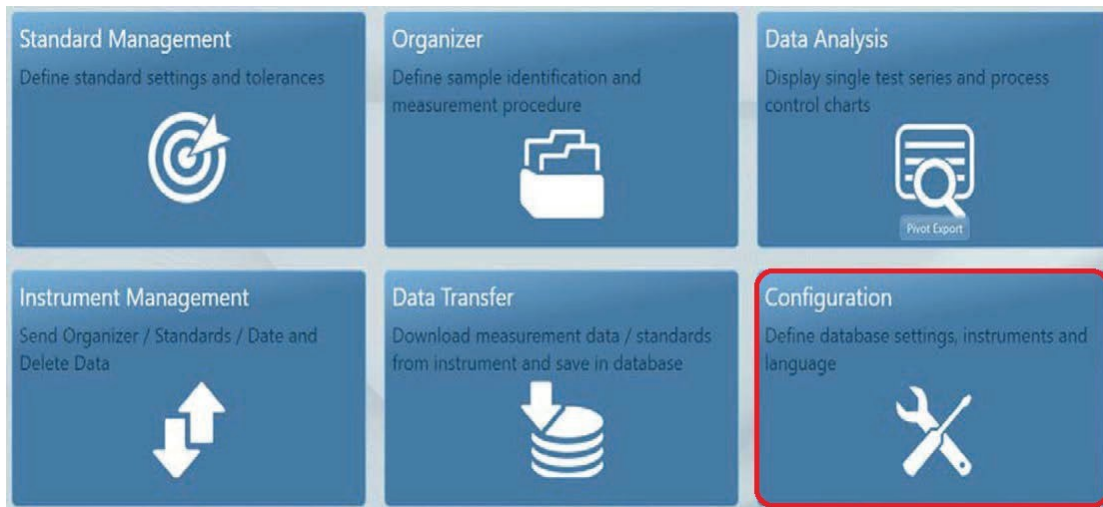


# 9

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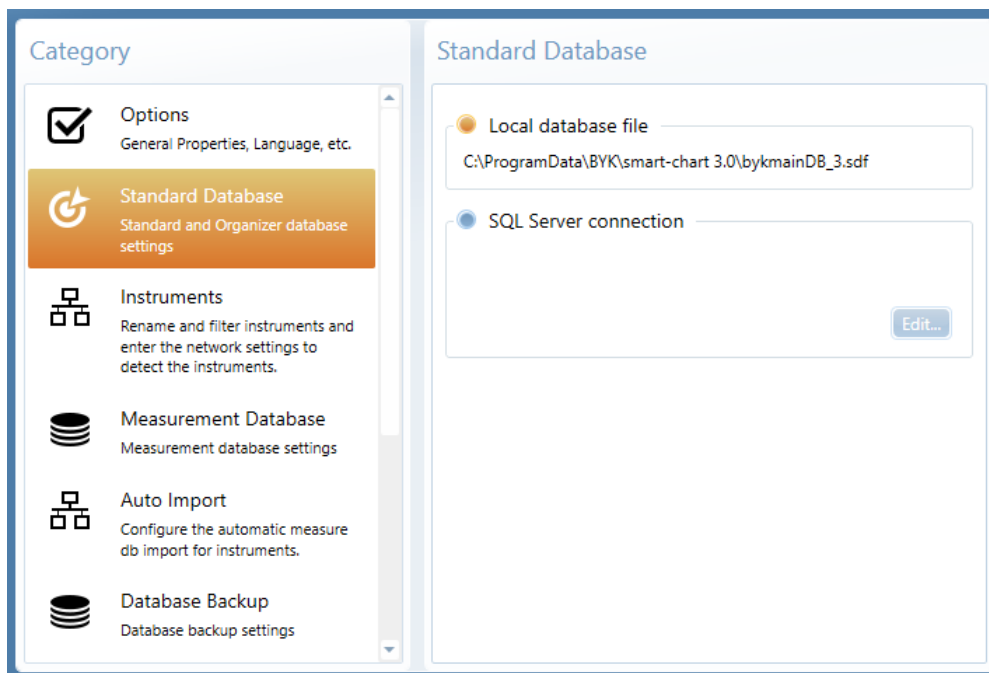
## Configuration

Define measurement database, load car schematics and assign names for parameters used in the organizer.

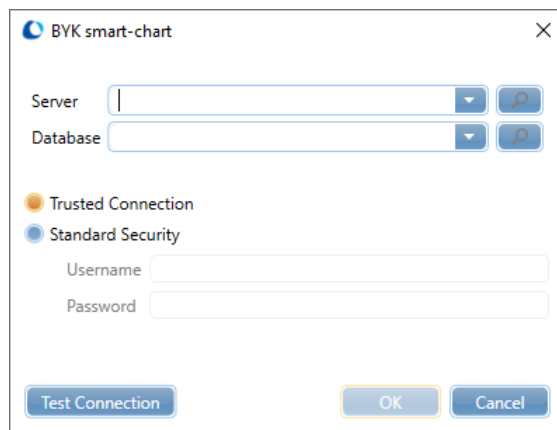


## 9.1 Standard Database

The standards (colors) and organizers (test procedures) are stored in the **Standard Database**. This DB is **fix assigned** to "C:\ProgramData\BYK\smart-chart 3.0\bykmainDB\_3.sdf".



It is also possible to use an **SQL Server Connection** to link an SQL database on a server, to which all defined users have access.



BYK smart-chart

Server

Database

Trusted Connection

Standard Security

Username

Password

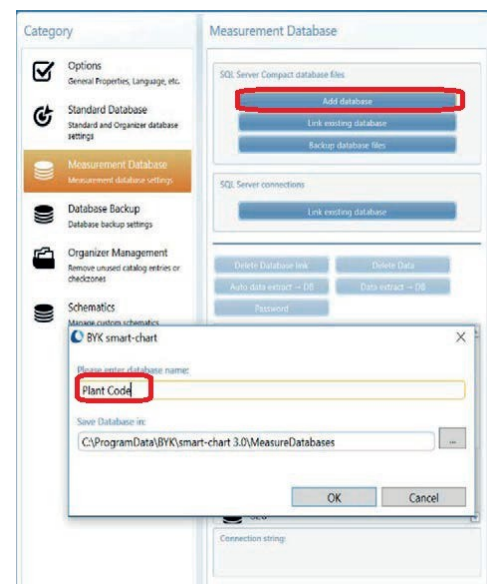
The connection details can be requested from the database administrator.

## 9.2 Measurement Database

Define measurement database:

- Select **Measurement Database**.
- Select **Add database**.
- Input database name e.g. "Plant Code".

**Note:** As default, the database is created in the folder:  
C:\ProgramData\BYK\smart-chart 3.0\MeasureDatabases



## 9.3 Delete Measurements



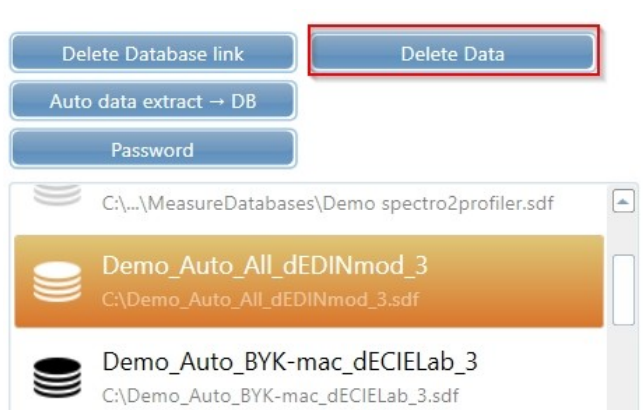
### NOTICE

It is recommended to create a backup of the database file before deletion of data.

Test series not required anymore can be deleted from the database:

- Select **Measurement Database**.
- Select the required measurement database.
- Select **Delete Data**.





The database is opened for the deletion of test series. This dialog is similar the module **Data Analysis**.

BYK smart-chart - Version 8.5.1 Release 25775

Status	Date	Instrument	Standard	Name	Param1	Param3	Param4	Param5	Ill / Obs
●	18/06/2012 12:19:23	BYK-mac 23mm	LightSilver	Model 1	Booth 1	Plant 1	315412776	D65/10	
●	19/06/2012 12:22:34	BYK-mac 23mm	LightSilver	Model 1	Booth 1	Plant 1	315413713	D65/10	
●	20/06/2012 12:34:52	BYK-mac 23mm	LightSilver	Model 1	Booth 1	Plant 1	315414653	D65/10	
●	21/06/2012 12:37:02	BYK-mac 23mm	LightSilver	Model 1	Booth 1	Plant 1	315415591	D65/10	
●	22/06/2012 12:39:20	BYK-mac 23mm	LightSilver	Model 1	Booth 1	Plant 1	315416524	D65/10	
●	25/06/2012 12:41:31	BYK-mac 23mm	LightSilver	Model 1	Booth 1	Plant 1	315417462	D65/10	
●	26/06/2012 12:43:45	BYK-mac 23mm	LightSilver	Model 1	Booth 1	Plant 1	315418385	D65/10	
●	27/06/2012 12:45:51	BYK-mac 23mm	LightSilver	Model 1	Booth 1	Plant 1	315419333	D65/10	
●	28/06/2012 12:48:09	BYK-mac 23mm	LightSilver	Model 1	Booth 1	Plant 1	315420274	D65/10	
●	29/06/2012 12:50:12	BYK-mac 23mm	LightSilver	Model 1	Booth 1	Plant 1	315421204	D65/10	
●	02/07/2012 12:52:36	BYK-mac 23mm	LightSilver	Model 1	Booth 1	Plant 1	315422124	D65/10	

To delete specific test series:

- Define the filter criteria on the top.
- Select **Reload** to apply the filter criteria.
- Select the test series to be deleted with **Ctrl** and/or **Shift**.
- Select **Remove data** to apply the filter criteria.

## 9.4 Manage Organizer Schematics

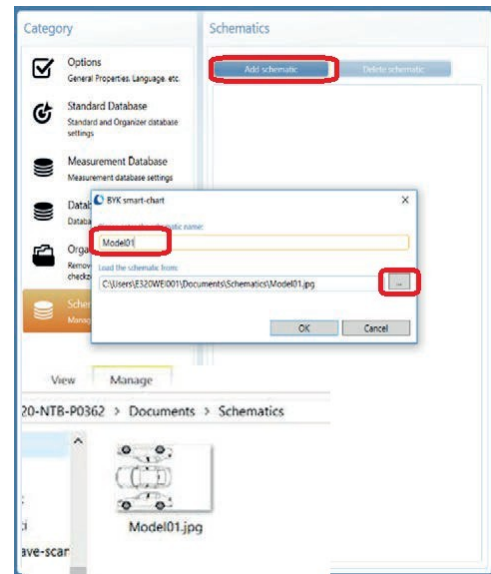
In **Schematics** the customer schematics to be used in the organizers are defined.

To load a new schematic:

- Select **Add Schematic**.
- Input a name, e.g. "Model01".
- Browse for respective file on your computer and load it.
- The data source location appears next to the Browse button.

**Note:** The following file formats are supported:

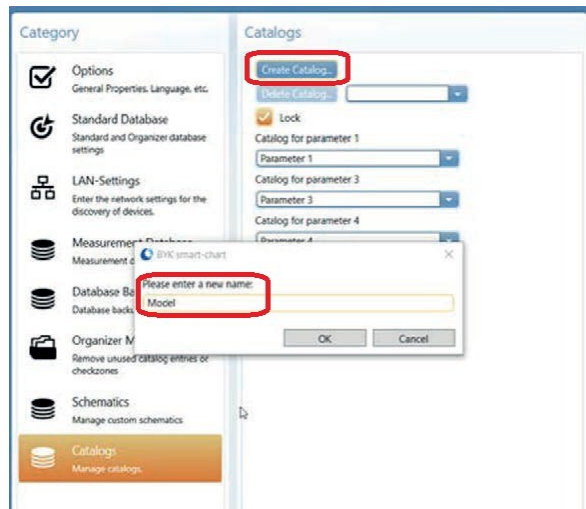
\*.png, \*.jpg, \*.jpeg, \*.xaml, \*.svg



## 9.5 Manage Organizer Parameters

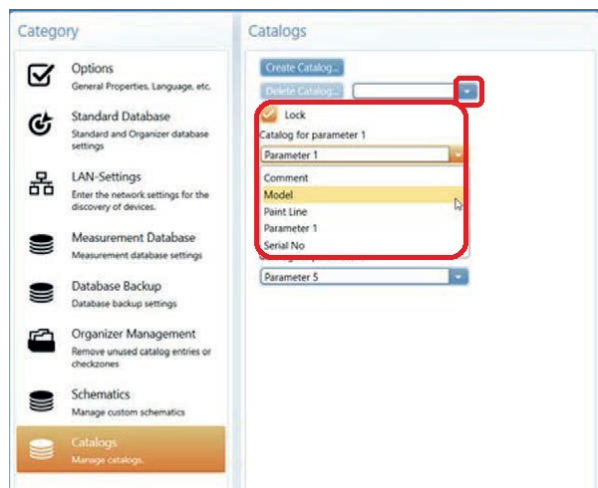
Assign names for parameters in organizer:

- Select **Catalogs**.
- Select **Create Catalog**.
- Input a name, e.g. "Model" and "Paint Line".



- Select the respective names for **Parameter 1 - 5** with the drop down box behind each parameter.
- If **Lock** is activated, only the selected catalog can be used in the organizer. Otherwise, all available catalogs can be selected.

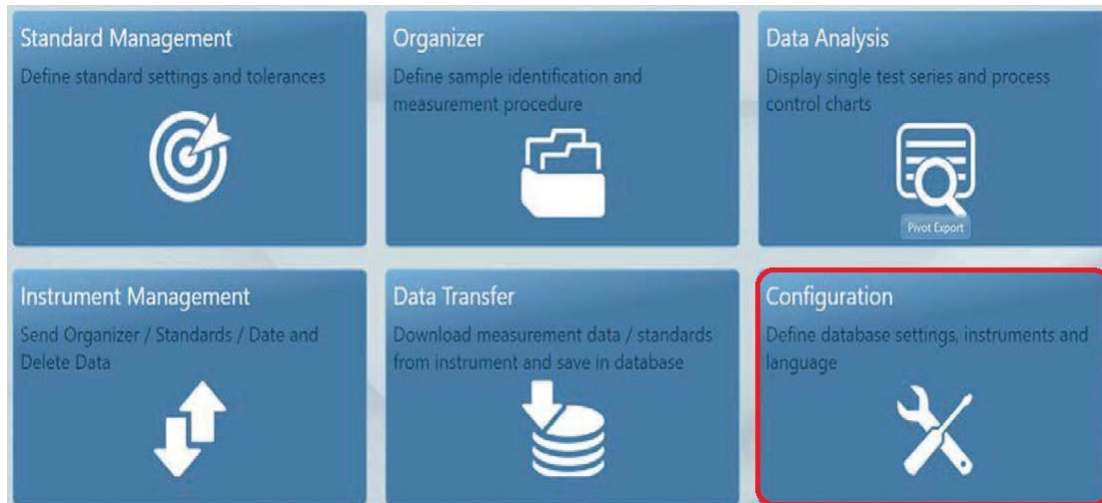
**Note:** Catalogs can be deleted by selecting them with the drop down box and click on **Delete Catalog**.



## 9.6 Data Backup

Backup of measurement data is very important to avoid any data loss. Running the back up at least once a week is recommended.

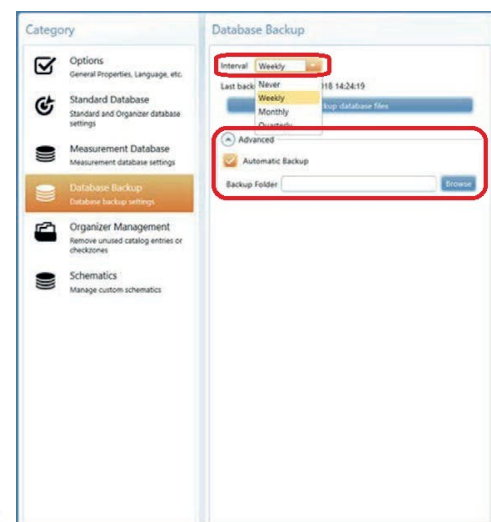
- In **Configuration**, an automatic backup procedure can be defined.



To backup the complete database:

- Under **Category**, select **Database Backup**.
- For the backup **Interval** select **Weekly**.
- Use the **Arrow** down in front of **Advanced** to activate **Automatic Backup** and **Browse** for the backup folder on your computer.
- A **folder** with the name shown below is created:
  - The name includes **date** and **time** of the backup.
  - The standard database as well as all linked measurement databases are saved.
- The backup is automatically done when smart-chart is terminated.

s2g_Seminar	13/08/2018 10:53	File folder
smartchart_backup_20180814_17.48.31	14/08/2018 17:48	File folder
smart-chart_projects	09/08/2018 13:54	File folder



Save all backup files on a second place, e.g. on an external hard disk or a USB flashdrive.



# Notes

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