

## Plate Measurement Device **SpectroPlate**

## Software **SpectroConnect**



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# Welcome

We welcome you among the worldwide community of users of TECHKON products. We are happy that you have selected this high-quality measurement instrument. It will be a valuable tool for your day-to-day quality control tasks. With this manual we invite you to learn how to use SpectroPlate.

The manual is divided into three chapters:

**CHAPTER 1:** How to use TECHKON SpectroPlate

**CHAPTER 2:** Description of measurement functions

**CHAPTER 3:** How to use the Windows software TECHKON SpectroConnect

For the first steps we recommend to read chapter 1; in particular paragraph 1.4.

You will be fascinated that after only ten minutes you will know how to work with SpectroPlate. The second chapter will show you detailed insight into the measurement functions and chapter 3 is about the Windows software TECHKON SpectroConnect, which is part of the package.

Please get the device registered by using the registration card, which you will find in the appendix of this manual. That way we can keep you updated about product news.

Please visit us as well on the internet at [www.techkon.com](http://www.techkon.com). You will find useful information about the complete product range and new software versions.

Do you have any suggestions for improvements or do you require information that goes beyond the contents of this manual? We will be glad to hear from you. Your suggestions or questions make an important contribution to the continuous optimization of our documentation and products.

Your TECHKON Team

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# Chapter 1

## How to use TECHKON SpectroPlate

### 1.1 Product description

#### Why measurements on printing plates ?

Today in the age of Computer-to-Plate it is obvious: Without quality control in pre-press, there is no guarantee for quality in print. Thus the measurement of the right dot transfer on offset printing plates is a key segment of comprehensive process control in the printing industry. However, measurement is only useful if the appropriate measurement technology is applied. Some years ago using densitometers on printing plates was common practice. But densitometers are designed for measuring on printed papers leading to limits when reading on plates.

At present, plate measurement devices based on microscopic image capture and processing are the established standard. TECHKON SpectroPlate unifies all advantages of this modern measurement technology in a compact hand-held instrument.

#### How does SpectroPlate work ?

The measurement accuracy of a plate-measuring device is determined by the quality of the optical system and the performance of the image processing algorithms. SpectroPlate meets the highest standards in this respect. The sample is illuminated uniformly with spectral broadband light. The microscopic image is captured by a precision optical lens system and a high resolution CMOS color matrix sensor with high dynamic range. The processing of the detailed color image is performed by a powerful graphic signal processor and sophisticated imaging algorithms. All relevant quality parameters for correctly manufactured printing plates are shown on the LCD.

#### Versatile in use

Thanks to the excellent image capture quality and the ingenious graphic calculations, SpectroPlate can read precisely any screen size and screen technology: FM, AM or Hybrid screen. The spectrally white illumination and dynamic color evaluation permits reading all kinds of plate types and coated surfaces.

But it is not only plate reading where SpectroPlate shows its strengths. The multifunctional device handles dot measurement on film as well as on printed paper in CMYK print excellently.

## Portable Microscope

SpectroPlate lets you see things normally hidden to the human eye. It shows the raster dots on a film or a printing plate in large magnification on the device display or optionally on a computer screen. It lets you visually judge printing plates and discover any soiling or exposure errors now that the structure of the raster dots is visible.

A specific strength is the image transfer of uncompressed high-resolution files to the PC where they can be stored, edited or sent over the internet. Geometric sizes of dots or lines can be retrieved in micrometer- or mils-dimensions.

## Software SpectroConnect

The supplied Windows software connects the device to a PC. Measured values and transfer curves are displayed and stored. The display of comparisons to target values, the data export to Microsoft Excel™ and the compatibility to RIP-applications are additionally useful functions of SpectroConnect. An exceptional feature is the enlarged view of the microscopic images.

## Permanently calibrated

SpectroPlate is factory-side calibrated. A white calibration adjusts the digital camera module. The screen calibration is for exact adjustment of dot percentage measurements towards the reference Plate Measuring Reference PMR. The calibration remains permanently and the devices are long-term stable. This means that there are no time intervals for recalibration necessary.

**The technical specifications are listed in the appendix of this manual.**

## All advantages at a glance



- Accurate measurements on all popular offset plate types
- For AM, FM, Hybrid, from low- to high-res screening
- Measures film in reflection and transmission
- Can be used as „Digital Microscope“
- With digital ruler
- Measurement button for convenient one-button operation
- Direct, secure positioning on the sample
- Measurement time approx. 1 second; immediately ready to use after switching on
- No time-consuming calibration necessary
  
- Highest absolute accuracy thanks to direct reference to absolute standard Plate Measuring Reference PMR
- Devices are factory-made calibrated permanently to accredited reference PMR
- High-resolution CMOS color matrix sensor
- High-precision optical system “Made in Germany”
- Homogeneous, spectral-broadband LED illumination
- Sophisticated image calculation and powerful signal processing
  
- Mobile, portable unit, also for remote use without PC
- USB port for the speedy transfer of measurement data to the PC
- Quickly rechargeable high-capacity batteries with charging console
- Upgrade from Start- to Expert-version via firmware upload from the PC
  
- Operation self explanatory; several menu languages selectable
- Large, high-resolution and high-contrast graphic display
- Solid, rugged design; nevertheless lightweight and compact
- No mechanically moving parts; therefore no wear and tear

## 1.2 Performance packages and packing list

### Three different performance packages

SpectroPlate is available in three different types of performance packages: The entry-level model **SpectroPlate Start** is for dot percentage measurements on all popular types of printing plates, film and CMYK-print. The **Expert**-version additionally features the recording of complete transfer curves and the possibility to analyze geometric objects within the device. The **Start**-version can easily be upgraded to the **Expert**-model by a post-purchase upload from the PC. The **All-Vision** version measures precisely on low-visible offset printing plates.

#### SpectroPlate Start

- % dot measurement
- Screen angle in °
- Screen frequency in l/cm and lpi

#### SpectroPlate All-Vision

- Same as **Expert** and additionally:
- Measurement of chemistry-low, process-low plates with very low visible contrast

#### SpectroPlate Expert

Same as **Start** and additionally:

- Dot transfer curve
- Dot gain curve
- Geometrical analysis: diameter, distance in micrometer and mils
- Memory for 100 data sets
- Average measurement

### Contents of delivery

- Measurement device SpectroPlate
- Charging console with white standard
- AC adapter with universal plugs
- USB cable for PC connection
- ISO 9000 compliant manufacturer certificate
- This manual (pdf on data media)
- Data media with TECHKON Software SpectroConnect



Contents of delivery of TECHKON SpectroPlate

### Optional accessories

- Upgrades to higher functionality
- Replacement parts: Charging console with white standard, rechargeable battery, AC adapter
- Offset printing plate reference: Plate Measuring Reference PMR (available only at Ugra, [www.ugra.ch](http://www.ugra.ch))

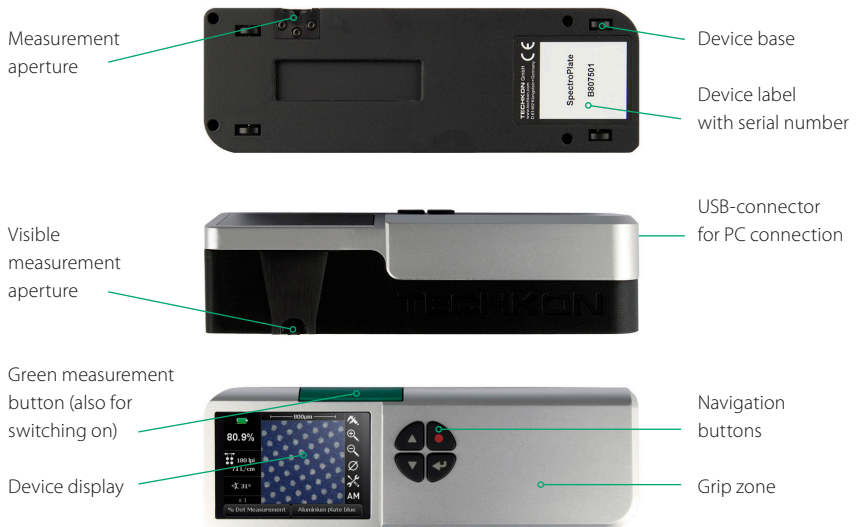


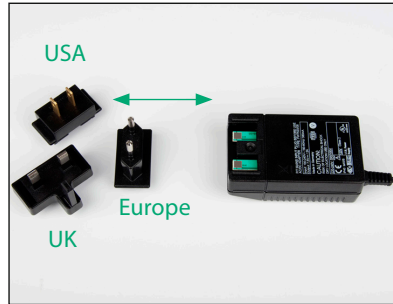
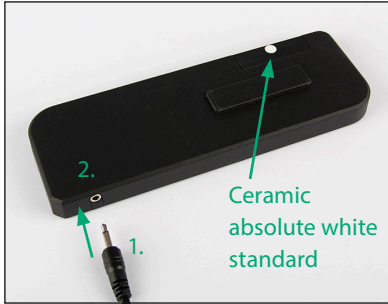
## 1.3 Design of SpectroPlate

SpectroPlate is a solidly designed measurement device which is very functional and easy to use. It is compact in size; the buttons can be reached with the right index finger when the device is held with the right hand. The LCD display is inclined towards the user, so the display information can be read clearly.

SpectroPlate can be easily positioned on the measurement sample. The measurement sample is illuminated uniformly by spectrally white LEDs.

The viewfinder helps selecting the right positioning of the measurement aperture. Additionally, the magnified live-image in the LCD display verifies the validity of the right spot to measure.





Connect the plug of the AC adapter (1.) with the charging console (2). The AC adapter can be used universally for 100 – 240 V and 47 – 63 Hz. Use only the original TECHKON SpectroPlate AC adapter. The use of other power sources is hazardous!

There are three adapter plugs for different countries. To change an adapter plug, just pull it off the AC adapter and push in the new one. Make sure it is connected firmly!

## 1.4 Working with SpectroPlate

### Switching on and off

SpectroPlate is switched on by pressing the green measurement button. It is immediately ready to measure. In this state power consumption is very low.

If no button is pressed within one minute, the device will switch off automatically. Switching it on again with the green measurement button will show on the display the last measurement done. There is no button to turn SpectroPlate off.

### Charging

The battery status is displayed as a battery symbol in the upper left corner of the LCD, when the unit is turned on.

When the battery turns empty, the battery symbol turns to red. In this state several measurements still can be obtained; but it is time to put it on the charging console to avoid a total discharge and damage of the battery.

Charging starts automatically by placing the device on the charging console. Please keep the charging contacts on the console and under the device always clean. Five

seconds after placing the device on the console the display will show an animated battery symbol. When the symbol displays a full battery, the charging is completed and the battery is fully charged.

Up to 10.000 measurements can be carried out with one battery charge. Completely charging an empty battery will take approximately four hours.

SpectroPlate has a regulated charging management. This means it will power-charge an empty battery, so the device can be used again after a few minutes. On the other hand, there is no overcharging of full batteries.

Disposal instructions: Please dispose of the battery only in a designated recycling center.

You can park the device on the charging console when not in use. This way it is guaranteed to have always an operational measurement instrument at hand.

## How to measure



After switching on SpectroPlate, it is instantly ready to measure. No calibration is to be carried out. Just position the measurement aperture above the area to be measured and press the green button shortly with your right index finger.

Within one second the resulting measurement value will appear on the display of the device.

Please make sure to perform measurements on flat surfaces only. The measurement aperture has to be directly on the sample without any distance in order to ensure the correct field of depth of the optical system. On the bottom of the device there are anti-slip rubbers which prevent the device from being moved during a measurement.

## Device settings with the display menu

The SpectroPlate display is divided logically into a section where the measurement results are displayed and a frame of "soft keys".

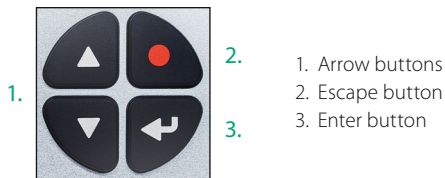
### NOTICE:

In the **Start**-version of SpectroPlate certain "soft keys" will be not selectable and are shaded in gray. These are the functions which are only available for the **Expert**- and **All-Vision**-model.

Pressing shortly on one of the Arrow buttons (1.) will move an active cursor from "soft key" to "soft key" around the frame. An active "soft key" is indicated by highlighted appearance.

By pressing the Enter button (3.) a function behind a "soft key" is selected and a selectable menu appears. Within such a menu again the navigation is done via the Arrow buttons and the selections are made with the Enter button.

The red Escape button (2.) is for canceling any procedure and for closing open menu windows in order to return to the measurement mode.

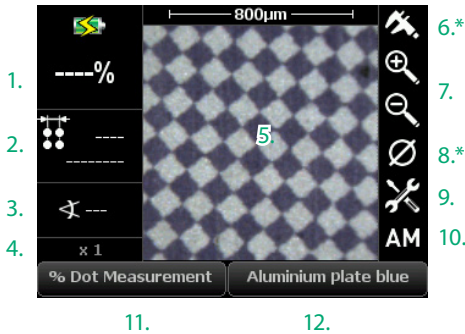


### NOTICE:

The following instruction describes the use of the **Start**-version of SpectroPlate. It applies to the **Expert**- and **All-Vision**-model as well.

Supplementary functions of **Expert** and **All-Vision** will be explained in the following chapter in detail.

Thanks to the interactive device menu, settings are very easy to adjust. The display is divided logically into the following segments:



The left side shows the measurement results:

1. Dot percentage
2. Screen ruling (= screen frequency)
3. Screen angle
4. Zoom factor

5. The center displays the captured microscopic image.

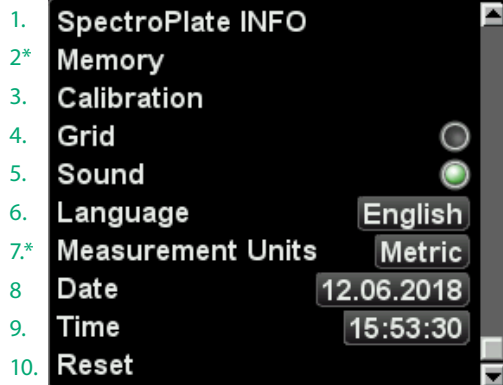
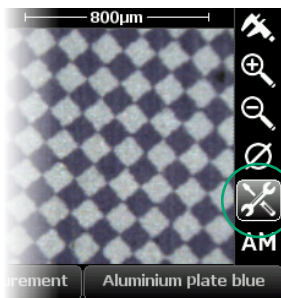
The right and lower corner contains the interactive “soft keys”:

6. Digital ruler
7. Zoom function
8. Average measurement
9. Device settings
10. Setting of the screen type
11. Measurement function
12. Plate type / measurement conditions

\* only SpectroPlate Expert and All-Vision

## Menu: Device settings

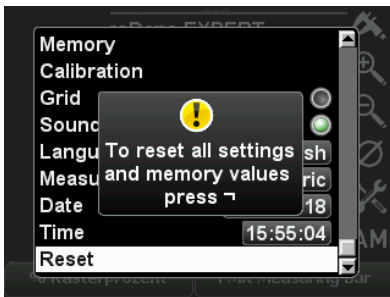
The “soft key” with the tool symbol opens the window for the device settings. Within this window you can navigate with the Arrow buttons and select with the Enter button. The red Escape button brings you back to the measurement mode.



\* only SpectroPlate Expert and All-Vision



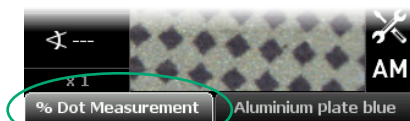
1.



10.

## Menu: Device functions

When the “soft key” in the left section of the lower bar of the display is activated, a windows opens where you can select the measurement functions. The measurement functions listed below are describe in chapter 2.



1. % Dot Measurement
2. Dot Transfer Curve
3. Dot Gain Curve
4. Geometrical Analysis

## Description of the device settings:

1. The SpectroPlate **INFO** screen shows the type of device (**Start, Expert, All-Vision**), the software-and hardware version, the serial number and the date of the device's last check.
2. The **Memory** and its content is managed here.
3. Performing a **calibration** is described on the next page.
4. Displays a **grid array** when activated.
5. Activated **sound** leads to an acoustic signal after each measurement.
6. Sets the menu **language** of the device.
7. **Measurement units** can be selected here.
- 8./9. All measurement values get a **time-** and **date-**stamp. This information will be visible when the data is transmitted to the PC software TECHKON SpectroConnect.
10. A **reset** puts the device to factory settings. **Attention!** All stored measurement values and recently made calibrations will be deleted. Only the factory-set calibration values are still valid.

## Index of the measurement functions:

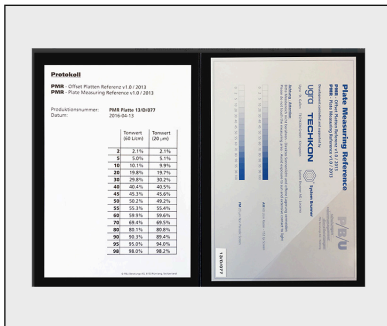
- |                         |       |
|-------------------------|-------|
| 1. % Dot Measurement    | p. 21 |
| 2. Dot Transfer Curve   | p. 22 |
| 3. Dot Gain Curve       | p. 26 |
| 4. Geometrical Analysis | p. 27 |

## Calibration

SpectroPlate is factory-side calibrated. A white calibration adjusts the digital camera module. The screen calibration is for exact adjustment of dot percentage measurements towards the reference Ugra Plate Measuring Reference PMR. The calibration remains permanently and the devices are long-term stable. This means that there are no time intervals for re-calibration necessary.

To ensure the correct operation of the device, we recommend to perform check-up measurements once a month. Before measuring make sure that the measurement aperture is free of dust. In case it has to be cleaned use oil-free, clean compressed air or an optics brush.

The suitable reference for check-up measurements is the offset sample plate Ugra Plate Measuring Reference PMR. It includes two percentage wedges, one periodic AM screen, one non periodic FM screen and a documentation with a protocol listing reference values taken with a laboratory instrument by the Ugra institute.



The Ugra Plate Measuring Reference PMR can be ordered at:  
[www.ugra.ch](http://www.ugra.ch).

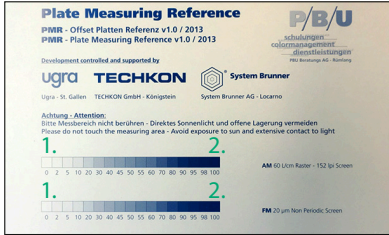
Ugra im Empa-Haus  
 Lerchenfeldstrasse 5  
 9014 St. Gallen – Schweiz  
 T +41 71 552 02 40  
 F +41 71 552 02 49  
 info@ugra.ch

We recommend to make five measurements per measurement patch and take the average value in order to level out measurement deviations caused by inhomogeneous percentage patches due to the production process of the PMR. The averaged measurement results of SpectroPlate have to be within the following tolerances:

AM screen (periodic):  $\pm 0,5\%$

FM screen (non periodic):  $\pm 1,0\%$

If the measurement results are out of tolerance, make a white calibration on the absolute white standard (delivered with SpectroPlate) and try again. If the values are still out of range, it is necessary to perform a screen calibration on a Ugra Plate Measuring Reference PMR.



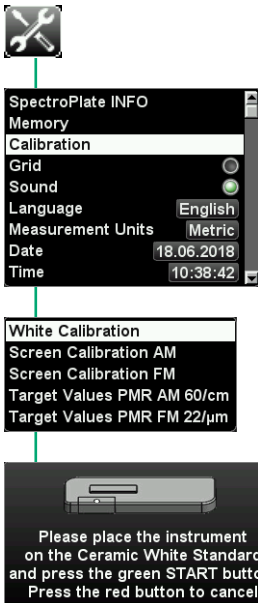
## Ugra Plate Measuring Reference PMR

The 0% (1.) and 100% (2.) patches are not measured.

Produktionsnummer: **PMR Platte 13/D/077**  
 Datum: **2016-04-13**

	Tonwert (60 L/cm)	Tonwert (20 µm)
<b>2</b>	2.1%	2.1%
<b>5</b>	5.0%	5.1%
<b>10</b>	10.1%	9.9%
<b>20</b>	19.8%	19.7%
<b>30</b>	29.8%	30.2%
<b>40</b>	40.4%	40.5%
<b>45</b>	45.3%	45.6%
<b>50</b>	50.2%	49.2%
<b>55</b>	55.3%	55.4%
<b>60</b>	59.9%	59.6%
<b>70</b>	69.4%	69.5%
<b>80</b>	80.1%	80.8%
<b>90</b>	90.3%	89.4%
<b>95</b>	95.0%	94.0%
<b>98</b>	98.0%	98.2%

Protocol with list of measurement values.



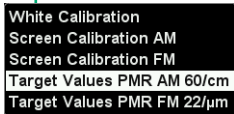
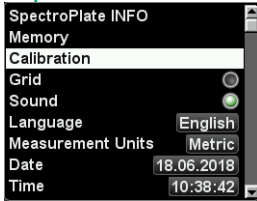
## White calibration

To carry out a white calibration, place the measurement device on the clean white standard, which is part of the charging console (see picture on page 10).

Select **Calibration** and then **White Calibration** from the menu **Device settings** and follow the instructions on the device display.

The calibration is confirmed by an acoustic signal.





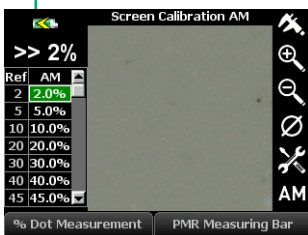
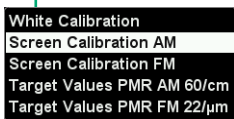
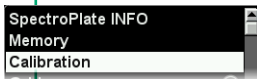
Ref	AM	Ref	AM	Ref	AM
2	2.0%	40	40.0%	70	70.0%
5	5.0%	45	45.0%	80	80.0%
10	10.0%	50	50.0%	90	90.0%
20	20.0%	55	55.0%	95	95.0%
30	30.0%	60	60.0%	98	98.0%

Calibration procedures for AM screen and FM screen are carried out separately.

By selecting **Calibration** and then **Target Values PMR AM 60/cm** or **Target Values PMR FM 22/μm** from the menu **Device settings** you get a window where you can edit the reference values

Edit the reference values from the list of the PMR protocol into the target values table in SpectroPlate.

Now perform the AM or FM measurements on the PMR plate.



Select **Calibration** and then **Screen Calibration AM** or **FM** from the menu **Device settings**.

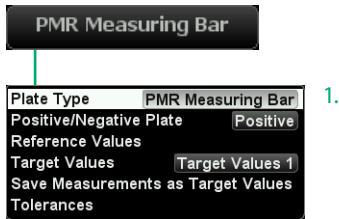
Place the measurement device on the clean white standard, which is part of the charging console (see picture on page 10) to carry out a white calibration.

Edit the reference values from the list of the PMR protocol into the table in SpectroPlate.

Now perform the AM or FM measurements on the PMR plate.

## Setting the plate type

SpectroPlate will carry out optimized image calculations depending on the type of offset printing plate used. Therefore the type of printing plate has to be selected. Also for measurements on film or printed paper the right setting has to be made first.



1. Select the plate type you are using from more than 150 different options. Select whether the plate has positive or negative processing properties. The dot percentage value will be shown as dot increase or decrease accordingly.

### Plate Measuring Bar

This setting is to be used for the check-up measurements on the Ugra Plate Measuring Reference PMR only.

### Aluminum plates

If the exact type of printing plate is not listed, select the plate closest to the color of your plate.

### Measurements on paper

Geometric dot percentage measurements on paper are only useful for a few specific applications. The geometric dot percentage measured precisely by SpectroPlate is not comparable to the dot percentage value based on the Murray-Davies formula measured with a densitometer. Please note that the standards for measurements on printed paper describe the use of densitometers and spectrophotometers.

### Film measurement reflection

Simply place the film on a white backing and perform the measurement. For gradations higher than 80% we recommend the measurement on film in transmission mode.

### Film measurement transmission

If a light table or light plate is available, this is the method of choice. Just place the film on the light table and perform the measurement. This function can also be used for digital flexo plates.

Your plate is not in the list ?

Please contact us! This list is permanently updated when new plates appear on the market.

The plate type is shaded in the list? Upgrade to **SpectroPlate All-Vision**. See chapter 2.3 for details.

## 1.5 Care and maintenance

SpectroPlate is a highly-precise optical instrument. It is designed to work in harsh, industrial environments. However, it should be handled with care. Avoid mechanical shocks, heat, dusty or humid environments.

### Cleaning

The measurement head with the optical system is sealed against dust and dirt. Take care that the visible, open measurement aperture is always free of dust. You can clean the measurement aperture with oil-free, clean compressed air and a brush used for cleaning photographic equipment.

Clean the device casing and the display window only with a soft cloth and a non-aggressive plastic cleaner. Never use alcohol or chemically aggressive solvent-based cleaners which can destroy the surfaces.

The same procedure is valid for the white standard which is integrated in the charging console. If the white standard should be defective, it has to be replaced completely.

Please do not stick any labels at the bottom of the device. This could lead to faulty measurements, because the direct contact – which is important for the correct optical field of depth – might not be maintained. The battery charge can be affected by a label as well.

### Device adjustment

Should SpectroPlate do not work properly, first check, if all instrument settings and measurement conditions are set correctly. Next perform a white calibration on the white standard which is integrated in the charging console and try again to perform measurements.

### Reset

A device reset sets the device back to factory settings. Stored measurement values, reference-, target-, and tolerance values will be deleted. If you have made a specific calibration the data will be lost as well. After a reset the device will work with the factory set calibration values which reference to the Plate Measuring Reference PMR. If the reset procedure in the settings window is not possible, a hardware reset has to be carried out. This is done by pressing the Enter button and the green measurement button simultaneously for 8 seconds.

## Device information and safety instructions

The use of this device in a different way than recommended by TECHKON GmbH can endanger the device safety.

**WARNING:** This device may not be used in potentially explosive atmospheres.

Please protect your eyes and do not look directly into the optics when the device is switched on.

Operating conditions: Ambient temperature: 10 to 35 °C, max. 30 to 85% relative humidity (non-condensing); storage temperature: -20 to 50 °C.

## Warranty

The warranty for TECHKON products is 24 months starting with the date of purchase. Consumable and wearing parts are excluded from this. The invoice is the certificate of warranty. The warranty is invalid if the damage is caused by inadequate use of the device.

Should a TECHKON product do not work according to the specification, please contact us before sending us the device. In most cases we can solve the problem over the phone or via E-mail.

## Inspection intervals

TECHKON SpectroPlate is maintenance free. We recommend **to validate the complete functionality of the devices in a 24 months time interval** in the TECHKON service center.

Please send the device always securely with complete accessories. For a flat fee the device will be cleaned, checked and re-calibrated. In case a repair or exchange of components should be necessary we will inform you in advance.

# Chapter 2

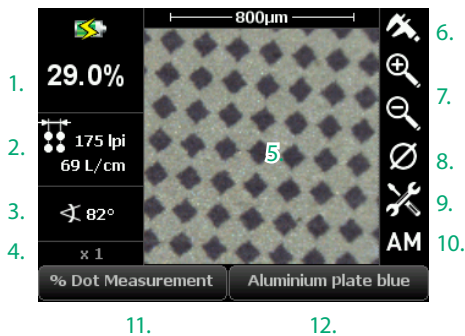
## Description of measurement functions

### 2.1 Measurement functions of SpectroPlate Start

#### % Dot Measurement

This measurement function displays the geometric dot area of a raster screen in percentage. It is the ratio between the area covered with dots and the total area. A value of 50% means for example, that half of the total area is covered with dots.

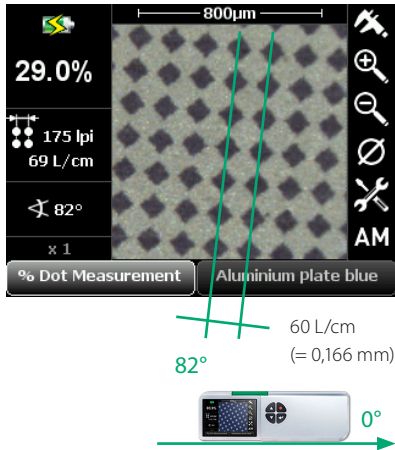
The right dot percentage value is an important quality control criterion, because it determines the amount of printing ink transferred to the paper and thus influences directly the color appearance.



1. Dot percentage
2. Screen ruling (= screen frequency)
3. Screen angle
4. Zoom factor
5. Microscopic image
6. Digital ruler
7. Zoom function  
The zoom function shows the image on the LCD display with a zoom factor of up to 4. Just select one of the zoom icons and press the Enter button to decrease or increase the zoom factor gradually. The current zoom factor is indicated under 4.
8. Average measurement
9. Device settings
10. Setting of the screen type  
The AM setting uses AM calibration data and the FM setting FM calibration data accordingly. For hybrid screens use AM setting.
11. Measurement function
12. Plate type / measurement conditions

The device will show a real-time live image, until the green measurement button is pressed. Then the image calculation delivers within a second the measurement values and the display turns to the result image. The display turns back to the live image automatically after five seconds or when the device is moved to another sample.

5.



The 0°-reference for the screen angle display is parallel to the front side of the device.

## 2.2 Additional functions of SpectroPlate Expert

### Dot Transfer Curve

For quality control of a printing plate the knowledge of the entire dot transfer for the whole gradation range is of great importance. It has to be analyzed how the different dot sizes and number of dots between 0% and 100% are transferred geometrically on the printing plate.

This transfer characteristic is drawn in a transfer curve. The horizontal axis lists the reference values in % and the vertical axis the measured dot percentage values. If the measurement values are on a 45° line, it means that it is a linear 1:1 dot transfer. An upturned transfer curve indicates a dot increase.

In order to record a complete dot transfer curve, all measurement patches of a gradation wedge have to be measured. A gradation wedge consists of consecutive measurement patches e. g. 10%, 20%, 30%, ...

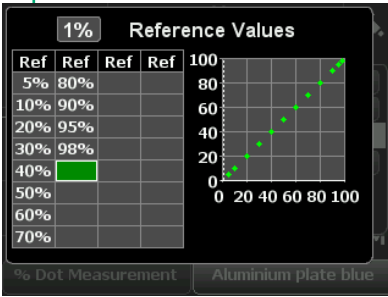
Before you can start measuring, specific settings have to be made:



Aluminium plate blue

Plate Type Aluminium plate blue  
 Positive/Negative Plate Positive  
 Reference Values  
 Target Values Target Values 1  
 Save Measurements as Target Values  
 Tolerances

1.



First, the type of gradation wedge has to be described. In this case it consists of 5%, 10%, 20% ... 98% patches.

With the Arrow buttons you can define the % reference value (1.) and by pressing the Enter button it will be put into the right location within the list.

Deleting a reference button works accordingly: Selecting with the Arrow buttons and removing it by pressing the Enter button.

Optionally, target values and tolerance ranges can be edited.

Aluminium plate blue

Plate Type Aluminium plate blue  
 Positive/Negative Plate Positive  
 Reference Values  
 Target Values Target Values 1  
 Save Measurements as Target Values  
 Tolerances

-----  
 Target Values 1  
 Target Values 2  
 Target Values 3  
 Target Values 4

Target Values 1

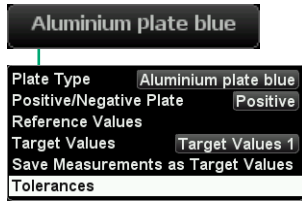
Ref	Ref		
5	5.0%	80	45.0%
10	10.0%	90	50.0%
20	15.0%	95	55.0%
30	20.0%	98	60.0%
40	25.0%		
50	30.0%		
60	35.0%		
70	40.0%		

The memory has four sections for target values.

Measurements can also be taken as target values

Just scroll between the values with the Arrow buttons and select one with the Enter button.

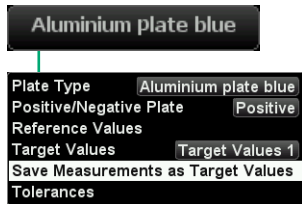
A small pop-up window opens where you can edit the new value using the Arrow buttons.



Tolerances

Ref	Tol	Ref	Tol
5	± 2%	80	± 2%
10	± 2%	90	± 2%
20	± 2%	95	± 2%
30	± 2%	98	± 2%
40	± 2%		
50	± 2%		
60	± 2%		
70	± 2%		

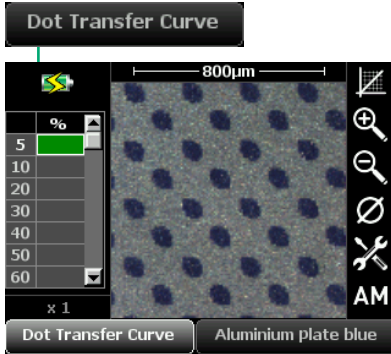
Analog to the setting of the target values you can define new tolerances.



- Target Values 1
- Target Values 2
- Target Values 3
- Target Values 4

This function will store an already measured curve as target values. A free assignment of the measured curve to one of the four sets of target values is possible.

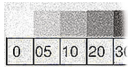




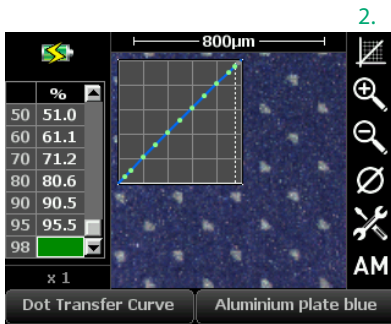
After all settings are done, we can start with the measurements on the gradation wedge.

The wedge is measured patch by patch. The 0% and the 100% patch are not measured; these are the fixed corner points of the curve.

In our example the first measurement is on the 5% patch, then follows the second measurement on the 10% patch, ...



1. 2. 3. 4. ... measurement



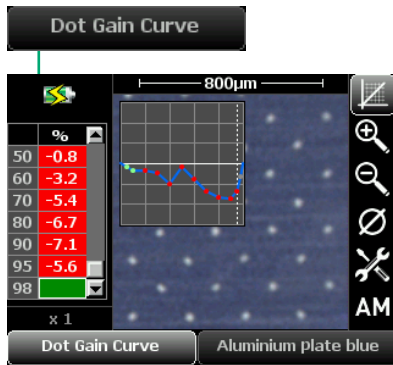
1. Reference patch measurement value
2. "Soft key" **Dot Transfer Curve**

A faulty measurement can be undone by pressing the red Escape button: The last measurement will be deleted and the device is ready to measure again.

After all measurements are done the "soft key" **Dot Transfer Curve** (2.) in the upper right corner can be activated. This will switch the display to the mode where the complete curve is shown.

The Arrow buttons allow navigation from value to value. The gray shading marks the area of values within the tolerance range. Measurement values out of tolerance are marked as crosses.

## Dot Gain Curve



The measurement function **Dot Gain Curve** is closely related to the function previously described.

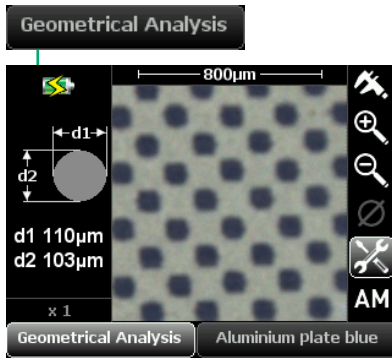
Now, the difference between measured dot value and reference value is drawn in a graph.

In this example the dot gain is a dot “loss”, because the value is negative.

Dot percentage - reference value = dot gain

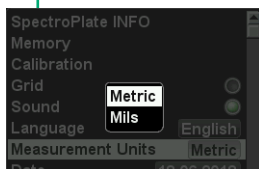
## Geometrical Analysis

SpectroPlate Expert can be used as a digital microscope as well. Microscopic small structures can be viewed on the LCD and can be transferred as high resolution image files to a PC.

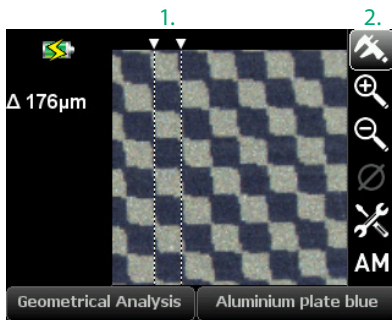


The measurement function **Geometrical Analysis** evaluates the geometrical properties of circles.

The smallest and the largest diameter are analyzed and displayed. If there is a certain number of circles within the sample area the average value of all circles captured for the smallest and largest diameter will be displayed.



The measurement unit can be either micrometer or mils, depending on the setting done.



1. Left and right reference of the digital ruler
2. "Soft key" **Digital ruler**
3. The zoom function can be used to view the object in the right size

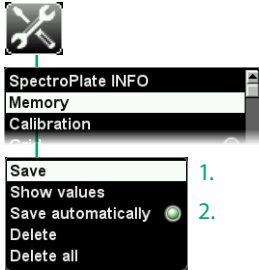
The "soft key" **Digital ruler** (2.) activates a function which allows to make microscopic distance measurements

The dotted lines are the left and right references to determine distances. The flashing line can be moved with the Arrow buttons. It gets locked by pressing the Enter button. Now the other line flashes and can be moved. The red Escape button or optionally the green measurement button lead back to the measurement mode.

The "soft key" **Digital ruler** can be selected from the measurement function **% Dot Measurement** and **Geometrical Analysis**.

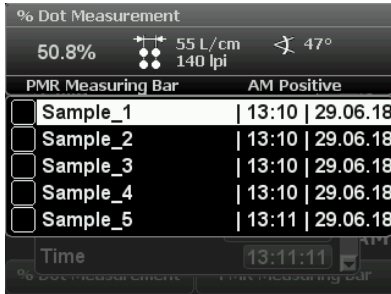
## Memory

SpectroPlate Expert and All-Vision can save up to 100 data sets. The measured data can be managed within the device and can be transmitted to the computer via the Windows software **TECHKON SpectroConnect** as well.



Access to the **memory** menu is via the “soft key” **Device settings** or as a shortcut by pressing the red Escape button and then the Enter button.

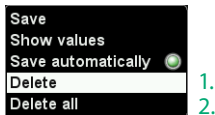
1. Saves the last measurement done.
2. Saves every measurement when activated which is indicated by a check mark.



Confirming **Save** (1.) by using the Enter button opens this window.

By navigating with the Arrow button all data sets can be displayed.

A data set consists of the information shown in the upper box. Up to 100 data sets can be saved. If the memory is full, the first entry will be overwritten.



1. Deletes single data sets.
2. Deletes the complete memory.



Data sets can be selected and deleted by using the Arrow buttons and the Enter button.

## Average measurement

Average measurements are useful when the measurement patch is not uniform. Then it is advisable to measure at different spots of the measurement patch.

This function requires **SpectroPlate Expert** or **All-Vision** in the measurement mode **% Dot Measurement**, **Dot Transfer Curve** or **Dot Gain Curve**.



1.

Start Average measurement  
 Stop Average measurement  
 Number of measurements 3

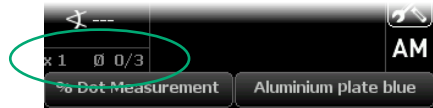
2.

3.

4.

1. “Soft key” for Average measurement.

2. **Start Average measurement** activates the average mode. The number of measurements to be made will be displayed.



3. **Stop Average measurement** cancels the average mode.

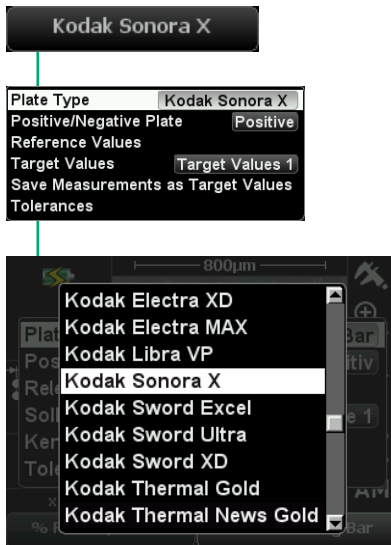
4. Up to 9 measurements can be set.

## 2.3 Additional functions of SpectroPlate All-Vision

**SpectroPlate All-Vision** is a special version of the SpectroPlate series for the measurement of chemistry-low, processless printing plates with a very low visible contrast. A specific spectral distribution of the measurement light source enables precise measurements on these modern printing plates.

**SpectroPlate All-Vision** has exactly the same menu functions as the **Expert** model.

The **Start**- and the **Expert** version can be upgraded to the **All-Vision** model via a hardware expansion. If interested, please contact us for details.



### Notice:

It is normal, that during the measurement of process-low plates the measurement light on the sample area will be less bright than known from the measurement of conventional plates.

### Selection of the plate type

The selection of the plate type is done as usual: process-low printing plate types can be selected from the Plate type menu as well.

Plate types available only for **All-Vision** will be displayed shaded in the **Plate type** menu of the **Start**- and **Expert** models.

Before taking measurements, the plate area to be measured has to be washed clean with a plate cleaner fluid or a dampening solution.

### Procedure to clean the plate area

Apply a thick layer of plate cleaner fluid on the area which has to be measured later and let it remain on the plate surface for approximately 1 minute. Then wipe it off the applied area with a soft cloth. Do not apply too much pressure while wiping it off in order to avoid that particles will be attached to the surface. In a final step wash off remaining cleaner fluid and particles by using a soft cloth and pure water (or solvent water which is used in the printing press). Be sure to make the measurements on the dry plate.

# Chapter 3

## How to use the Windows software TECHKON SpectroConnect

### 3.1 Software description

The supplied Windows software **TECHKON SpectroConnect** allows to transfer measurement data to the PC and to make device specific settings from the PC. The measurement values



can be displayed on the computer monitor. Additional functions are the graphic display of transfer curves and dot gain curves including target values and tolerances and the possibility to transfer the measurement values directly into other Windows applications, e.g. Microsoft Word™, Excel™ or RIP software. A very useful feature is the graphical display of microscopic, high-resolution images directly on the computer screen.

When using **SpectroPlate Start** the device has to be connected to the PC via the USB-cable when making measurements. The values will be instantly visible on the computer screen.

**SpectroPlate Expert** and **All-Vision** has an internal memory of up to 100 data sets. This means, measurements can be taken without the device connected to a computer. When connecting the device to the PC later, all stored measurement values will be transmitted instantly in one row.

The software requires a computer with a free USB port and a completely installed Microsoft Windows 7, 8 or 10 operating system.

### 3.2 Installation

It is important, to carry out the following steps in the right order, to make sure that the USB device driver will be installed properly.

1. Make sure that the device is **NOT** connected to the PC.  
Insert the delivered **SpectroConnect** CD into the CD drive of the running computer.
2. The installation routine will start automatically.  
Follow the steps of the installation, until it is completed.
3. Now, after the installation is finished successfully you can connect the device with the Micro-USB cable to the computer.

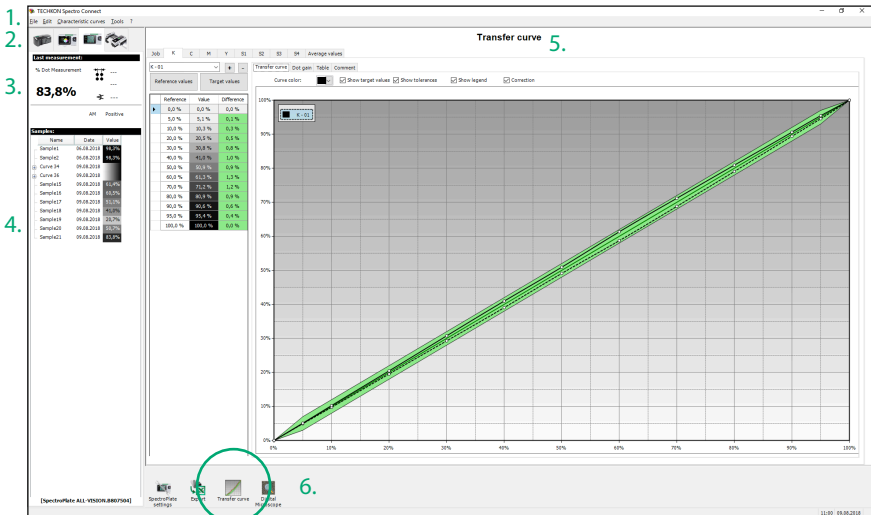
### 3.3 Overview

The application will be installed in the Windows program files section in the folder **TECHKON GmbH / TECHKON SpectroConnect**.

Software symbol  
SpectroConnect



After starting the program and selecting the SpectroPlate icon in the upper left corner, the main screen **Transfer curve** will appear. It is divided into three logical segments: On the left side the contents of the device memory, on the right side the active program module and at the bottom the program module bar, which lists all available and selectable modules.



1. The menu bar includes functions known from standard Windows applications. They comprise: New, Open, Save, Print and Quit.

2. In this section, the appropriate measurement device can be selected.

3. The measurement window shows either the last measurement taken or the measurement values of a data set selected from the lower list.

4. When **SpectroPlate Expert** or **All-Vision** is connected the contents of the memory will be shown here.

5. Active program module

6. Shows the list of available program modules. They can be selected from this bar directly via mouse click.

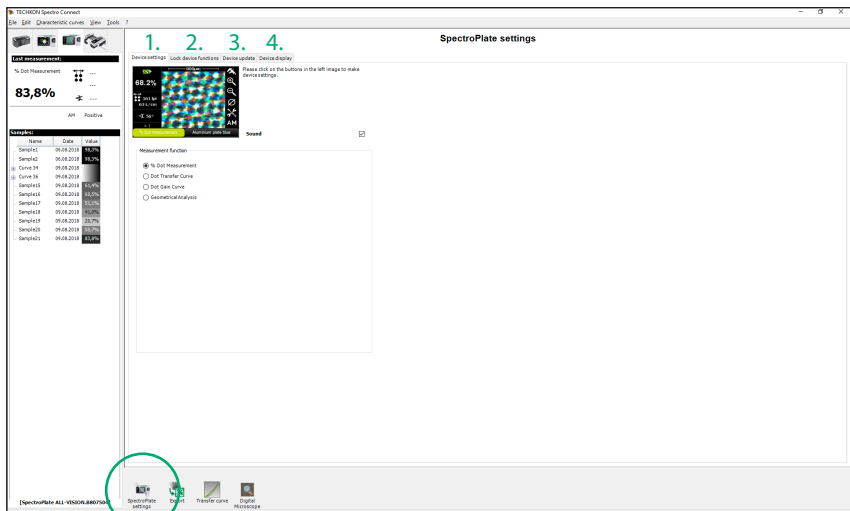
After launching **TECHKON SpectroConnect** it is pre-set to display the module **Transfer curve**.



## 3.4 Software module: SpectroPlate settings

In this module device specific settings can be made via PC.

1. **Device settings:** All settings, which can be made at the device can also be made with this software feature. It is very convenient for typing numerical values of references and tolerances.
2. **Lock device functions:** Device functions can be locked and unlocked with this feature. Locked functions will appear in shaded gray on the LCD display.
3. **Device update:** New device software can be uploaded into the device. There are two different types of files to upload:
  - Device update: loads the new version of device software
  - Device upgrade: upgrades from **SpectroPlate Start** to **Expert** (charged)
4. **Device display:** This shows the device display on the computer screen. All measurement buttons can be remotely operated by the mouse pointer. The screenshot can be saved. This is a very useful feature for product trainings.



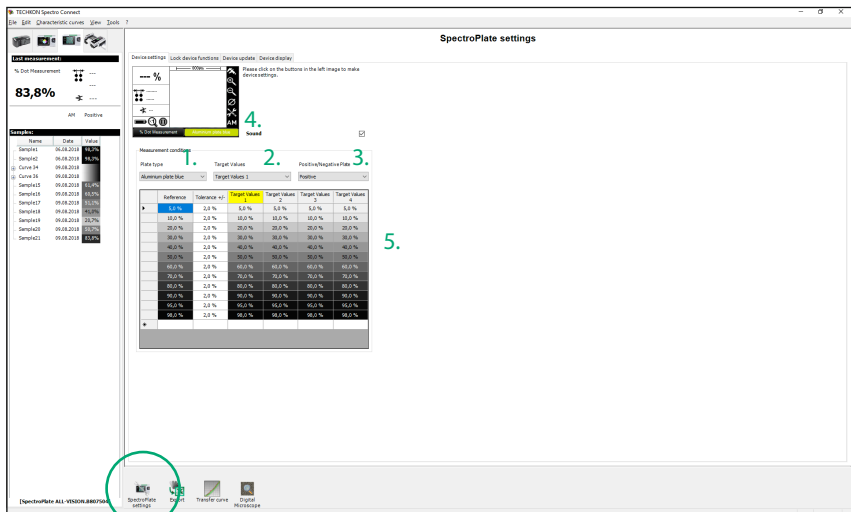
### 3.4 Software module: SpectroPlate settings

The software module **SpectroPlate settings** allows to select the plate type (1.), the table of target values (2.) and positive or negative plates (3.) directly.

First click on the soft key **Measurement conditions** (4.) in the lower right section of the displayed image. A new section opens below the image, which contains the three pop-up bars for plate- and target adjustment.

There are different possibilities to edit a selected table of target values (5.):

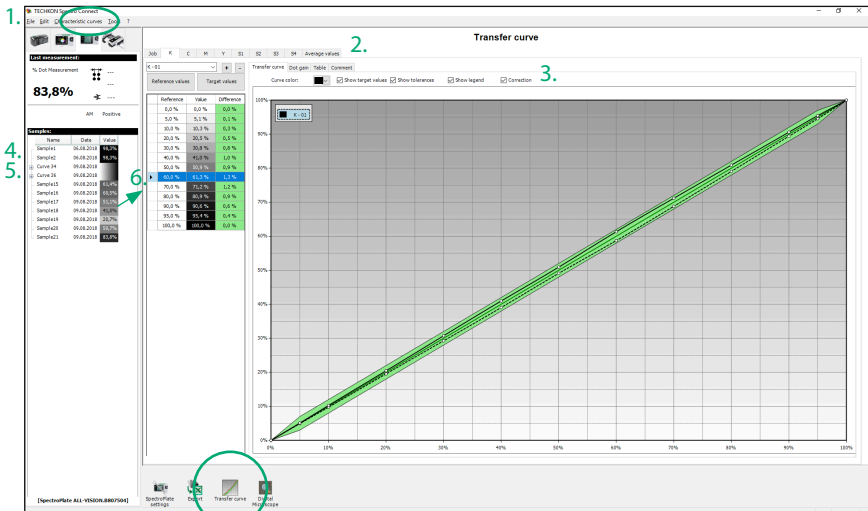
- New reference steps can be added at the last line of the table.
- The already listed reference steps can be edited with a simple double-click on the reference value to be changed.
- Not required reference values can be erased with the delete key.



## 3.5 Software module: Transfer curve

This module is for displaying the **Transfer Curve**. The curves can be built up by single measurements with SpectroPlate connected.

With **SpectroPlate Expert** or **All-Vision** complete transfer curves can be recorded remotely without the PC connection. The data transfer can be carried out later.



1. Clicking on the menu item **Characteristic curves**, a pop-up window appears where transfer curves can be added or deleted.

2. Any number of transfer curves for Black, Cyan, Magenta and Yellow as well for up to four spot colors S1 – S4 can be managed. The **Average values** window shows the mean values out of selected curves. The **Job** window allows the user to edit comments.

3. Most settings can be made directly by mouse clicks

4. Single measurements carried out in the measurement function **% Dot Measurement** will be shown as "Samples".

5. Complete transfer curves recorded with **SpectroPlate Expert/All-Vision** in the measurement function **Transfer curve** are marked as "Curves".

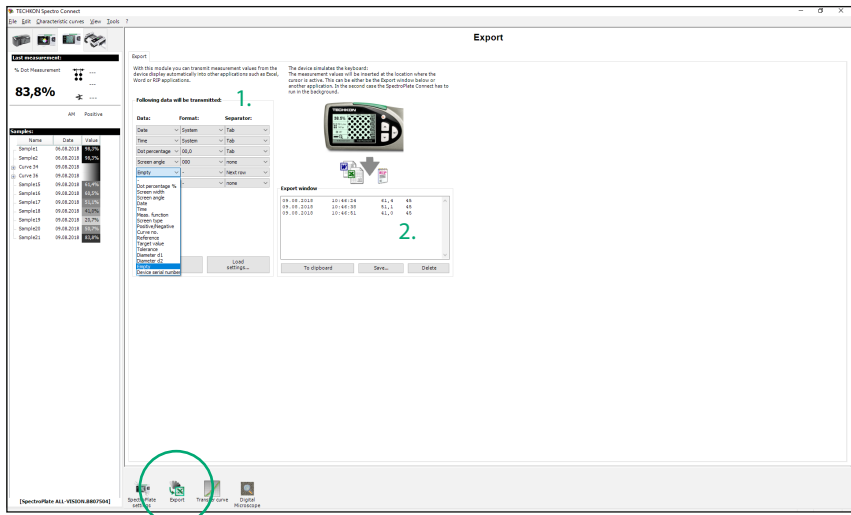
6. Measurement data can be moved with the mouse pointer by „Drag and Drop“ from one side to the other.

Also the display as a dot gain curve or as a numerical table can be selected.

## 3.6 Software module: Export

Measurement data can be exported in any other Windows application e. g. Microsoft Word™, Excel™ or a RIP calibration software.

SpectroPlate works like the keyboard: Pressing the measurement button will place the measurement value automatically at the location where the cursor is.



1. Here is defined, which data will be transmitted, how it will be formatted and what type of spacing between the measurement data will be.

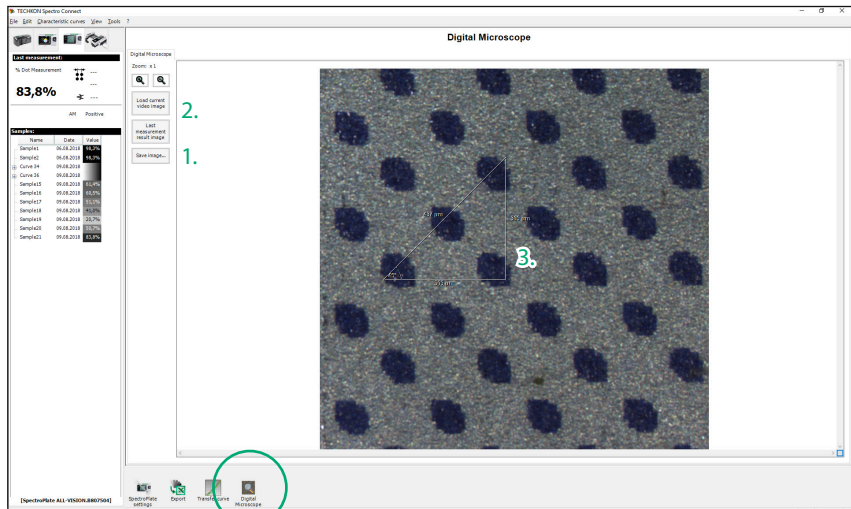
All settings can be saved and recalled later.

2. The **Export** window can also be used for testing data transmissions.

This example shows the following: Three measurements have been made. One data set consists of date, timer, dot percentage and screen angle. The delimiter is a "Tab" followed by "Return".

## 3.7 Software module: Digital Microscope

In this module the captured image is displayed. The image resolution of the microscopic image is 1024 x 1024 pixels.



1. The image can be saved in different file formats.

The image resolution is always 1024 x 1024 pixels. This will not be changed by different zoom factors.

2. Original image and result image correspond directly to the image data from the measuring device.

The original image is a 24 bit RGB color file and the result image is a grayscale binary bitmap.

3. The **Digital ruler** function is operated with the mouse pointer: Select the start point with the mouse pointer and keep the left mouse button pressed. Now, move to the end point and release the mouse button.

The result is a triangle with horizontal, vertical and resulting dimensions in micrometer and the angle in degrees.

The triangle will not be part of the image data when the image is saved.

## Specifications

Measurement technology	High-precision optical system with high resolution digital camera and digital image processing
Image capture	1024 x 1024 pixels, 16 million colors, RGB uncompressed
Measurement aperture	1 x 1 mm, direct positioning with viewfinder, real-time image preview captured in LC graphic device display
Light source	Homogeneous spectral-broadband LED illumination
Measurement time	Approximately 1 second per measurement
Calibration	Factory-made calibrated permanently, white standard in charging console
Measurement range dot %	0.0 – 100.0%
Screen ruling range	AM: 30 – 150 l/cm, 75 – 380 lpi; FM: 10 – 70 microns
Measurable media	Offset printing plates – CtP and conventional, film in transmission and reflection, printed paper CMYK
Memory	100 data sets (only Expert and All-Vision)
Repeatability	± 0.5%
Display	Color LC backlight display, anti-reflective, 320 x 240 pixels
Power supply	Rechargeable LiFePO4 battery, regulated recharge via charging console with AC adapter, 100 – 240 V, 47 – 63 Hz, approx. 10000 measurements per battery charge, battery level control
Communication Port	USB
Weight	490 grams
Dimensions	61 x 50 x 185 mm (approximately 2.4 x 2.0 x 7.3 inches)

System requirements for TECHKON software:

Windows 7, 8 or 10; 32- and 64-bit, minimum: IBM-compatible PC with Intel Core Duo processor or comparable processor, 4 GB RAM, 2 USB ports

## Manufacturer certificate

applicable for ISO 9000 documentation

**Device:** Plate Measurement Device TECHKON SpectroPlate

**Serial Number:**



**Manufacturer:** TECHKON GmbH • Wiesbadener Str. 27 • D-61462 Königstein  
Telephone: +49 (0)6174 9244 50 • Telefax: +49 (0)6174 9244 99  
info@techkon.com • www.techkon.com

**Certification:** The device is compliant with EU directive 2014/53/EU concerning the electromagnetic compatibility EMC and is provided with the CE label. The device is RoHS compliant (class 9).

Notice: The supplied AC adapter is according to regulations UL, IP 40, IEC 950 and VDE EN-EC10. The device is to be used only with the original TECHKON SpectroPlate AC adapter.

**Maintenance:** The device is maintenance free. The measurement aperture has to be kept clean from dust. It can be cleaned with clean, compressed air and an optics brush.

We recommend a functionality check-up every 24 months at the TECHKON service center, which includes the issue of a new Manufacturer certificate.

**Warranty:** The warranty for TECHKON products is 24 months starting with the date of purchase. The warranty is invalid if the damage is caused by improper use of the device. Only original TECHKON spare parts and accessories are to be used.

**Recycling:** The device is according to §14 ElektroG registered under the EAP no.: DE 98280049. Devices for disposal can be sent directly to the manufacturer.

**Calibration:**

SpectroPlate is factory-side calibrated. A white calibration adjusts the digital camera module. The screen calibration is for exact adjustment of dot percentage measurements towards the reference plate Plate Measuring Reference PMR. The calibration remains permanently and the devices are long-term stable. This means that there are no time intervals for recalibration necessary.

To ensure the correct operation of the device, we recommend to perform check-up measurements once a month. The suitable reference for check-up measurements is the Plate Measuring Reference PMR, which can be ordered at:

Ugra im EMPA-Haus, Lerchenfeldstr. 5, CH-9014 St. Gallen, [www.ugra.ch](http://www.ugra.ch), Tel. +41 7155202-40, Fax +41 7155202-49

We recommend to make five measurements per measurement patch and take the average value in order to level out measurement deviations caused by inhomogeneous percentage patches due to the production process of the PMR. The averaged measurement results of SpectroPlate must be within the following tolerances with respect to the reference values in the PMR evaluation protocol:

AM screen (periodic):  $\pm 1\%$

FM screen (non periodic):  $\pm 1\%$

If the measured values are outside the tolerances, you must first perform a white calibration on the supplied white standard. If, after renewed control measurements, the measurements are still outside the permissible tolerances, raster calibration must be performed on the PMR reference, as described in the chapter **Calibration**.

Place

Date

Signature

D-61462 Königstein

---



**EU-Konformitätserklärung**  
EC-Declaration of Conformity  
Déclaration de Conformité de la CE  
Dichiarazione di conformità CE

**Hersteller:** TECHKON GmbH  
Manufacturer / constructeur / costruttore

**Adresse:** Wiesbadener Str. 27  
Address / adresse / indirizzo

**erklärt, dass die Produkte:** D-61462 Königstein  
Declares that the products / déclare, que le produits / si dichiara che il prodotto

**Typ:** SpectroPlate  
Type / tipo

**Verwendungszweck:** Farbmessungen  
Intended use / utilisation prévue /  
uso previsto Color measurements / mesure de la  
couleur / misurazione del colore

**bei bestimmungsgemäßer Anwendung den grundlegenden Anforderungen gemäß EU-Richtlinie 2004/108/EC entspricht und dass die folgenden Normen angewandt wurden:**

complies with the essential requirements of the 2004/108/EC Directive, if used for its intended use and that the following standards has been applied: / répond aux exigences essentielles de l'article 3 de la directive 2004/108/EC, prévu qu'il soit utilisé selon sa destination, et qu'il répond aux standards suivants: / soddisfa tutti i requisiti della direttiva 2004/108/EC qualora venga utilizzato per l'uso previsto e che le seguenti norme siano applicate:

**angewendete Norm:** EN 55022:2006  
Applied standard / standard appliqué /  
norma applicata issue / édition pubblicato

**Ausgabe: 2008-05**  
**+A1: 2007**

**EN 55024**  
**Ausgabe: 2003-01**  
**1998+A1:2001+A2:2003**

Please copy this registration card and send it by mail or via telefax to us. This way we can keep you informed in future about product news. You can send your registration information by E-mail as well.

TECHKON GmbH ■ Wiesbadener Str. 27 ■ D-61462 Königstein/Germany ■ Telefax: +49 (0)6174 9244 99 ■ E-mail: info@techkon.com



## TECHKON Registration card

- Please send me information about the entire TECHKON product range
- Please put my E-mail address on the mailing list for the TECHKON-Newsletter

TECHKON GmbH  
Wiesbadener Str 27  
D-61462 Königstein

Via telefax to: +49 (0)6174 9244 99

Name: \_\_\_\_\_

Company: \_\_\_\_\_

Department / Job title: \_\_\_\_\_

Address: \_\_\_\_\_

City / ZIP-Code: \_\_\_\_\_

Country: \_\_\_\_\_

Telephone: \_\_\_\_\_

Telefax: \_\_\_\_\_

E-mail: \_\_\_\_\_

Your TECHKON-Dealer: \_\_\_\_\_

Device Serial number: \_\_\_\_\_  
(Label on the bottom of the device)

Erfolg ist messbar

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