BST

iPQ-Check customer operator training

04.07.2023

perfecting your performance

//Introduction

System description:

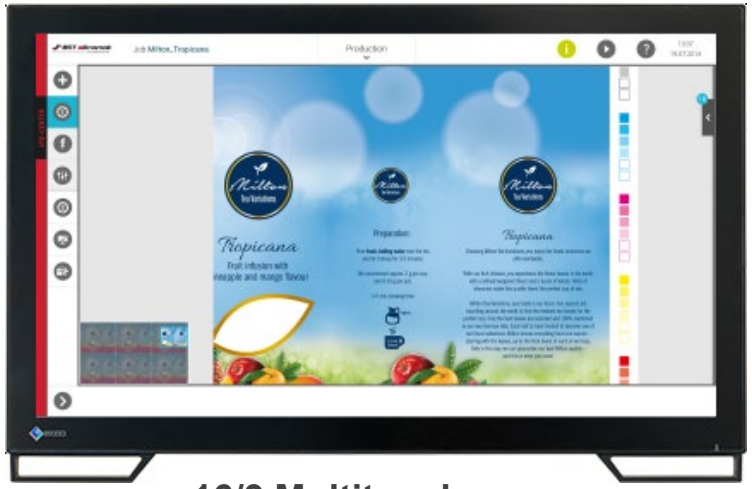
- The iPQ_Check system is a combination of a 100% image viewing and a 100% print defect detection system.
- iPQ_Check is using line chip cameras and a high performance Image processing PC to scan the web for printing defects.
- The system can be modular upgraded with additional matrix cameras and further software options like e.g. spectral color measurement and barcode quality measurement.

//System description

- Definition

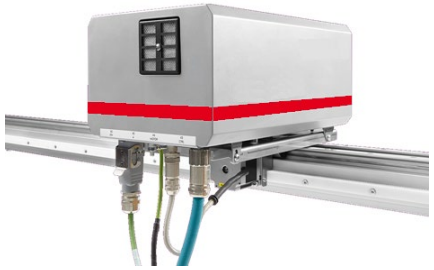
  - The iPQ-Check scans 100% the printed web for possible printing defects.
  - iPQ-Check is a tool for the operator to evaluate the printing quality in the producing machine.
  - It offers high quality information about deviations from the printing quality.
  - The operator is enabled to make decisions about the production quality and the possible/necessary changes within the printing process.

//iPQ-Center overview



16/9 Multitouch screen

Traversing cameras (option)



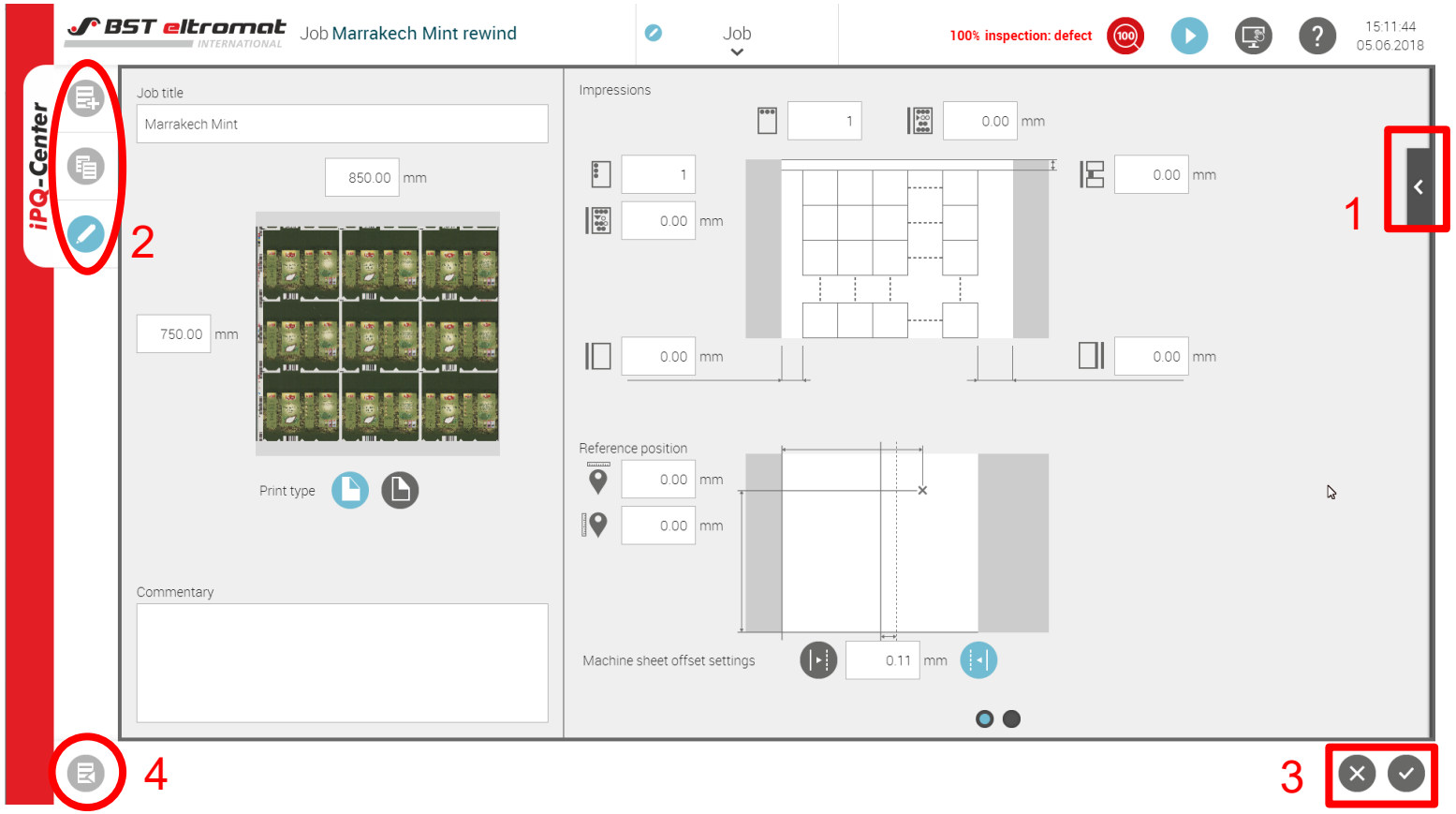
Spectral color measurement (option)

High performance image processing PC

100% print inspection line chip cameras

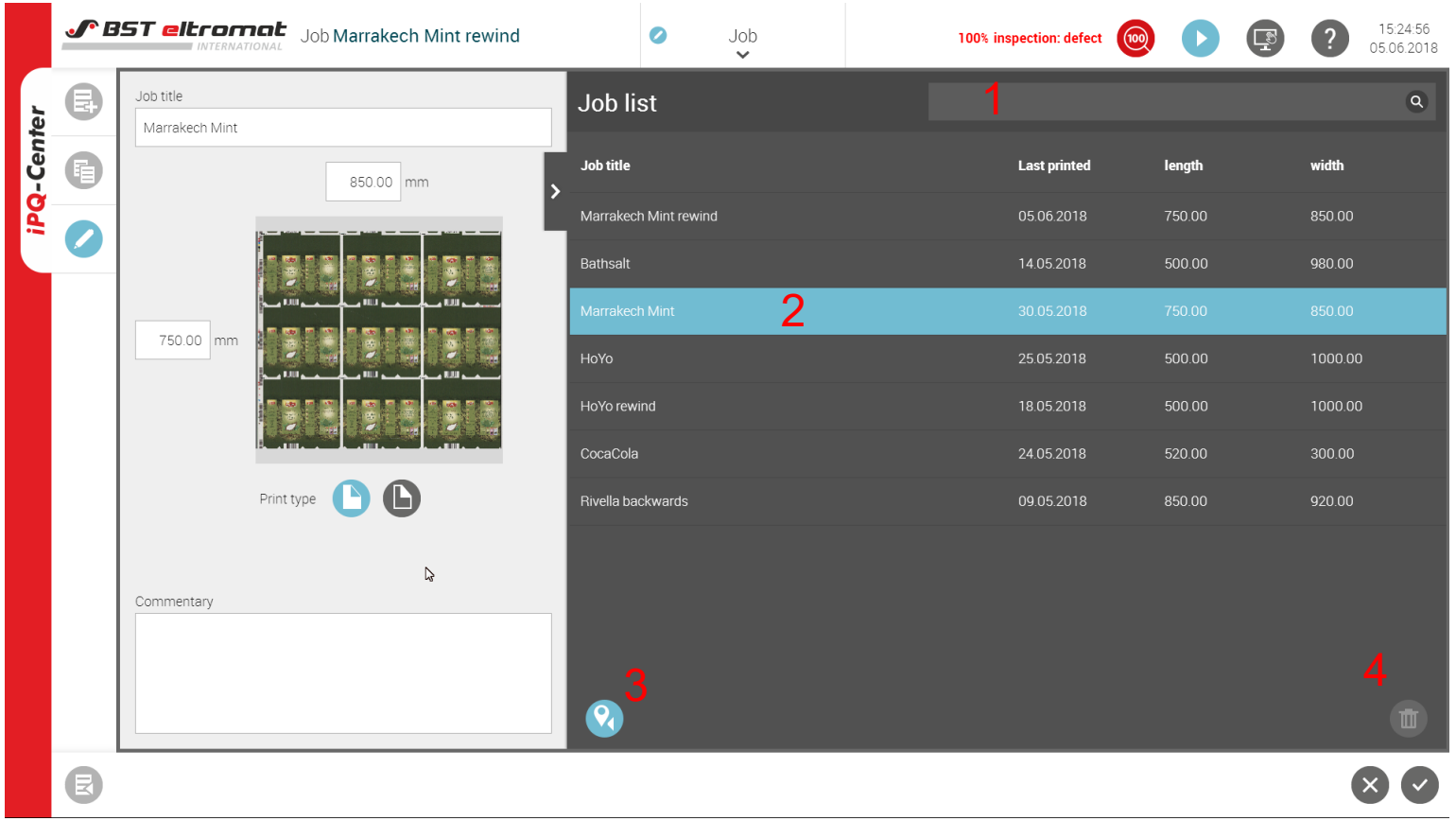
Job preparation

//Job preparation overview



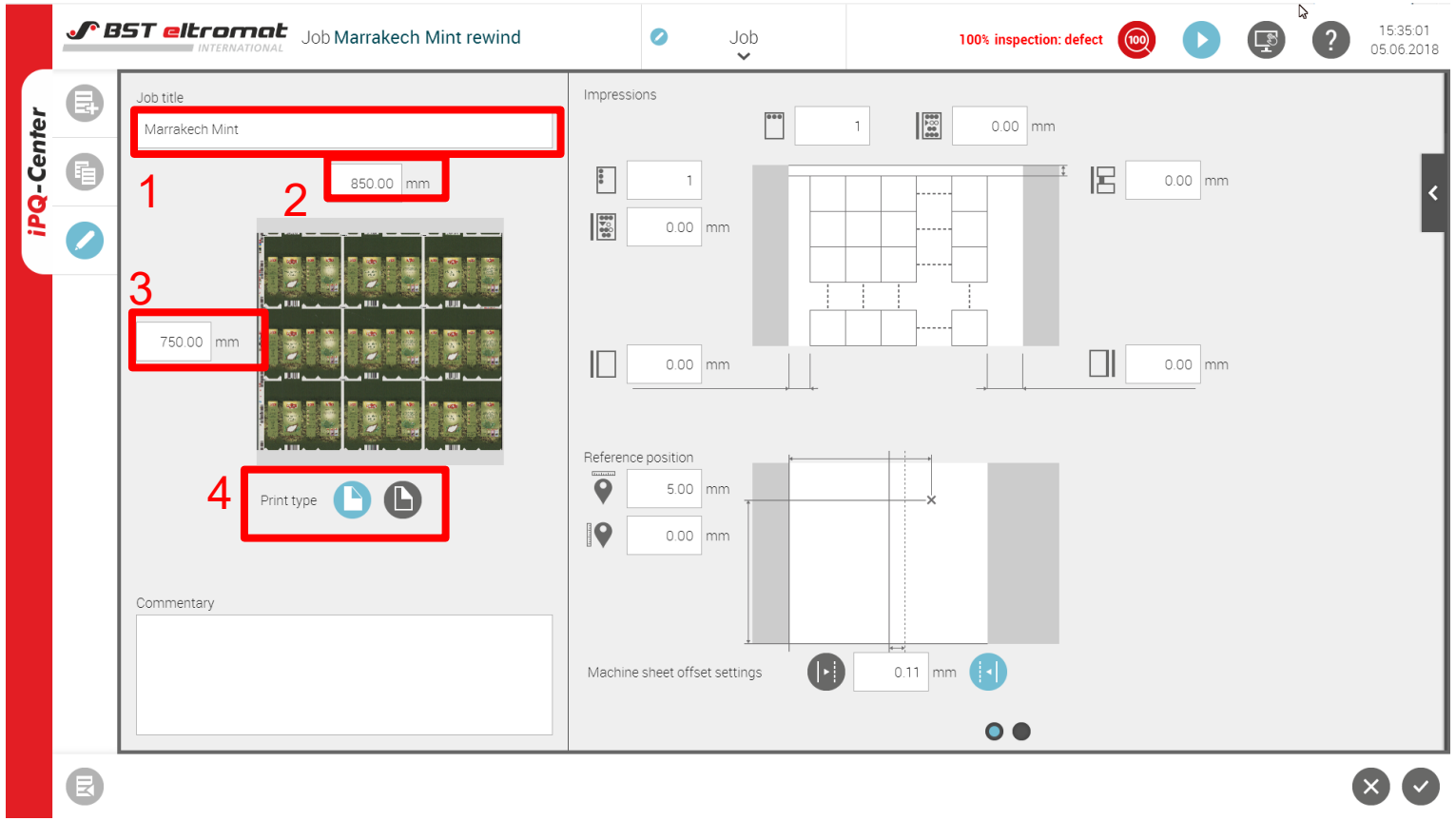
1. Open Job list to load /edit / copy job
2. Create / Copy / Edit Job (top to bottom)
3. Save / Discard changes
4. Load selected job from job list into system

//Job preparation job list



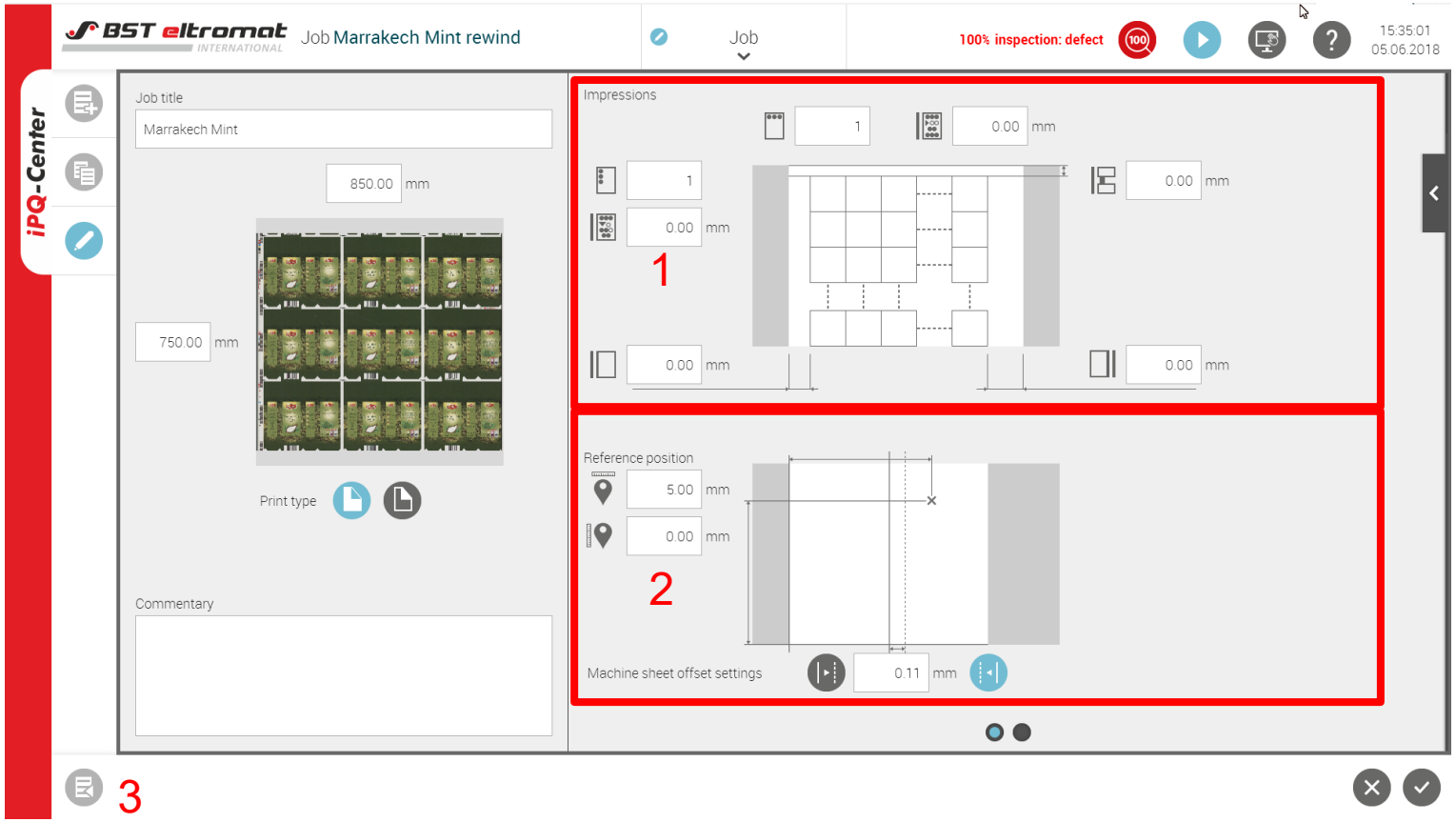
1. Search for job name
2. Selected job (blue background) 200 master jobs can be stored in the job list.
3. Reference-button: saves the design, anchor setting and format start of the job for repeat job purpose. Comfort function, repeat jobs must have same design!
4. Delete selected job (one by one)

//Job preparation basic settings



1. Give identifying job name (Order number is given later when job is loaded)
2. Enter the material width or inspection width. Both web edges must not be seen by the 100% line cameras, enter value approx 5mm less for each side.
3. Enter the cylinder repeat.
4. Select print type front print (left icon blue) or reverse print (right icon blue)

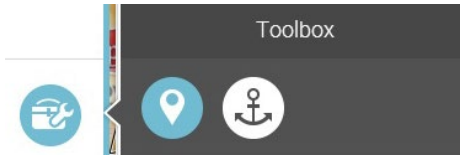
//Job preparation optional settings



1. Enter values for the repeat function of the automatic modes for e.g video positions, barcode or colour measurement options.
2. Enter the values for a Reference position for additional image lock trigger sensors and/or to set the format start and position. See also chapter „Reference position“ in production menue.
3. Load job into system. (Without load job the system can not work.)

//Job loaded into system, production started

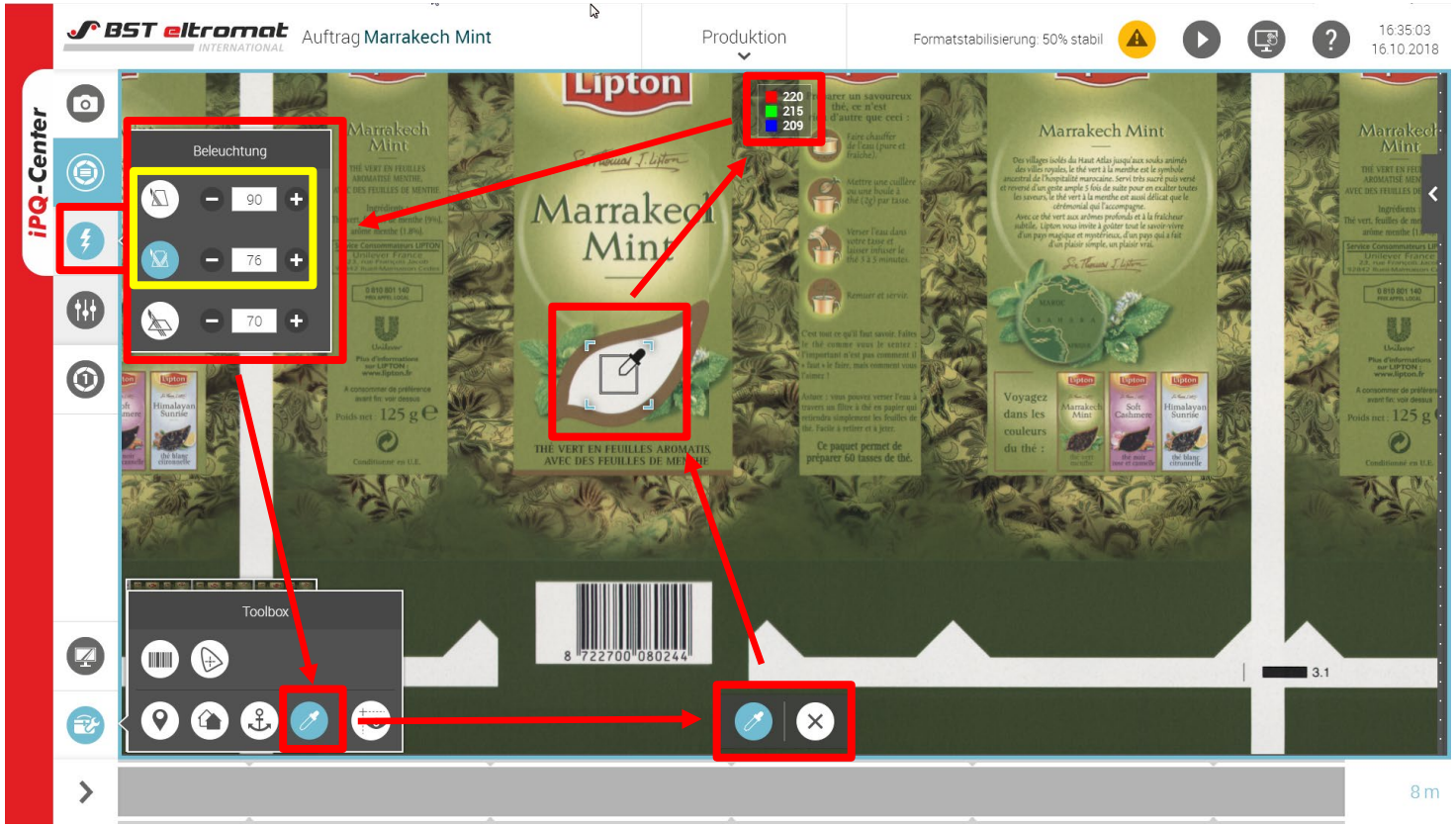
1. This job is loaded to the system, all work will be saved on this job.
2. System status, warning and error messages.
3. Activation and setup of camera and illumination options.
4. Toolbox to adjust camera image (see next pages)
5. Setup of options, modules and display of inspection results.



Setup of LED illumination

//Setup of LED illumination

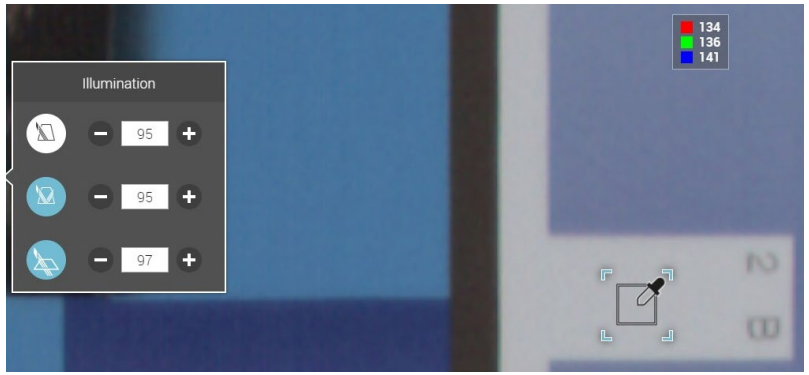
This screenshot shows how to measure RGB values with the pipette function.

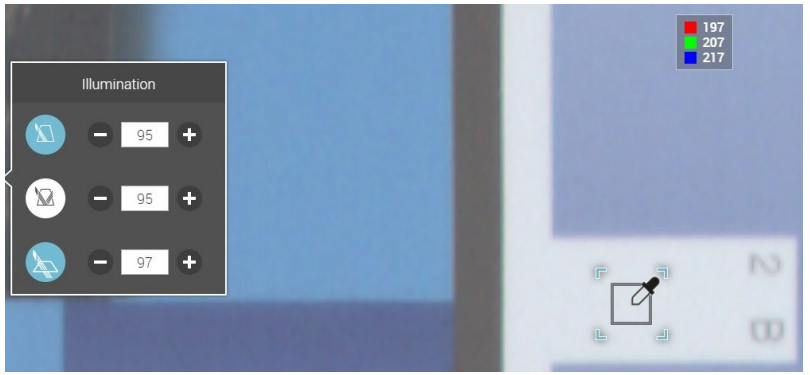


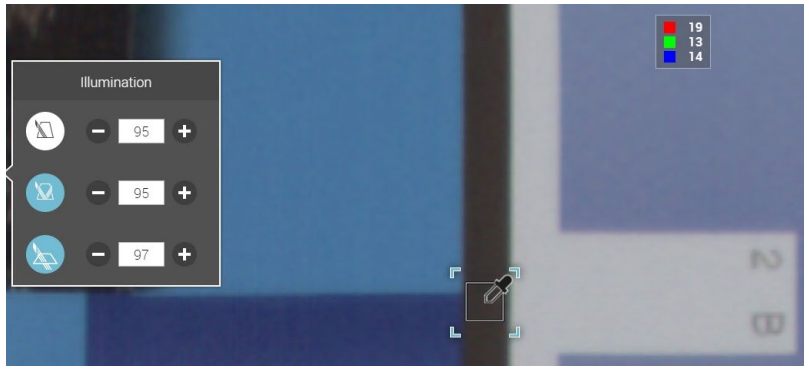
Select and setup the optimal intensity of LED-illumination before you learn the reference image.
Check with help of the function “pipette” from the toolbox the RGB-values.
The illumination which brings good strong contrasts is best for 100% print defect detection. RGB values between 200-230 on white with 10-20 on black would be ideal. Higher than 250 is critical. Also the “quality” of the learned reference picture is important. See next pages for explanation.

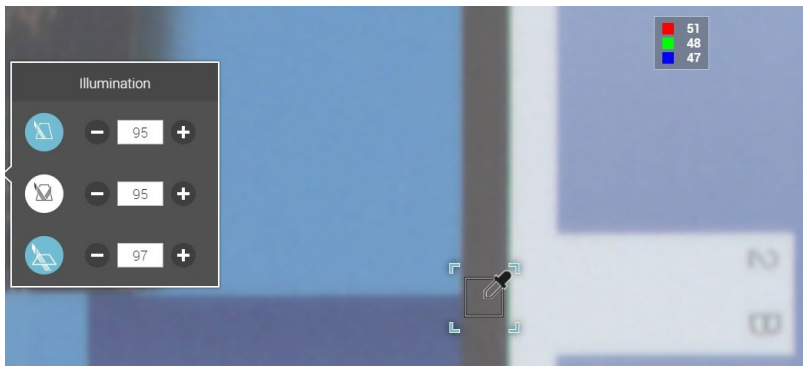
//Setup of LED illumination

See next page for a format overview in split screen of these two example setups.







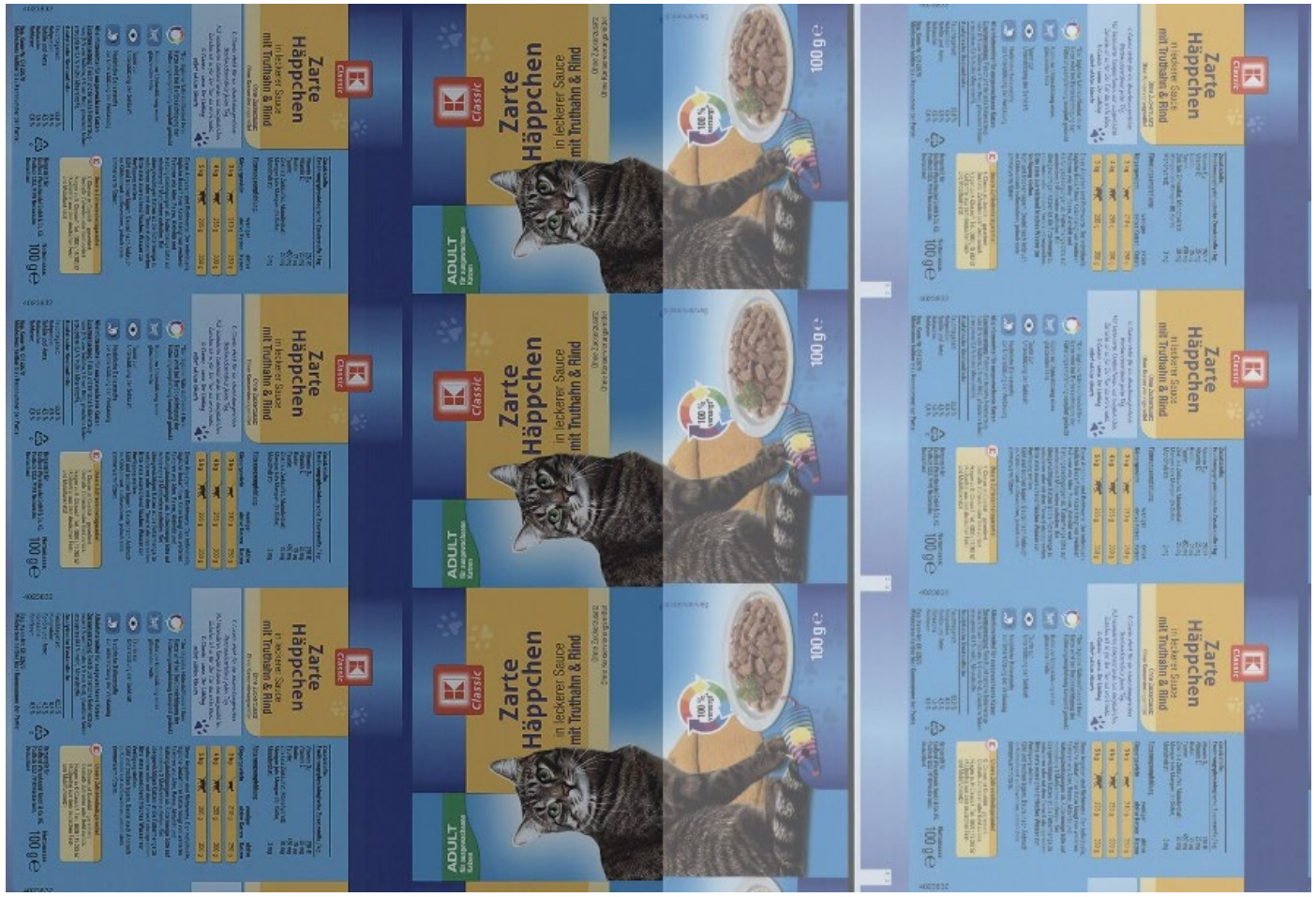


Good illumination setup. The RGB values in white are not very high, but the black areas show good deep values. The picture has a good contrast. Good for 100% defect detection.

Bad illumination setup. The RGB values in white are higher, but the values in black are too high. The picture looks blury, the contrasts are not good to find low contrasted printing defects.

//LED illumination selection and contrasts

Good illumination setup. Good contrasts

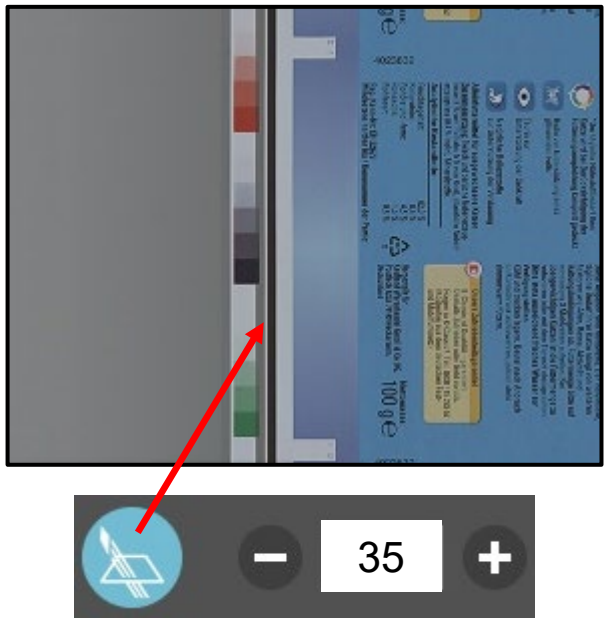


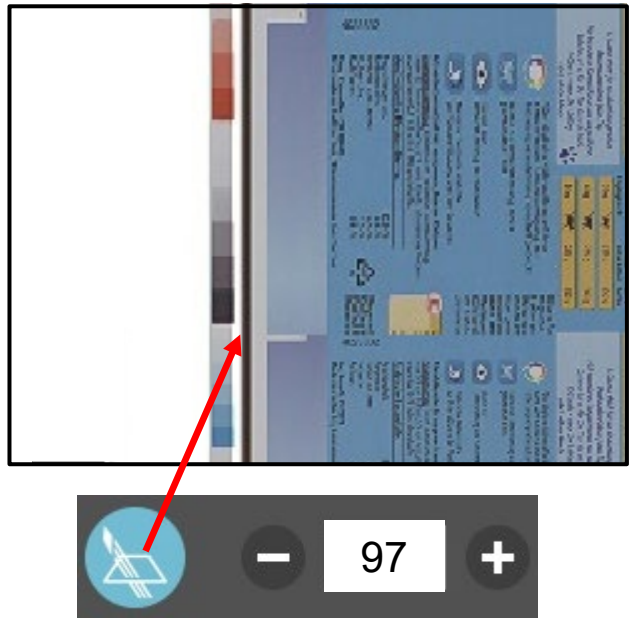
Bad illumination setup. Bad contrasts

Split screen image from before page illumination setup examples.

//LED illumination setup on transparent film

LED backlight setup





Transparent materials need a background with a different contrast than the backwhite to be able to detect printing defects from the backwhite. The background should be setup darker (left image). A brighter background (right image) is often beneficial to bring higher contrasts and RGB values to defects from the other process colours. Both will avoid shadow effects at the printed edges to full transparent areas.

RGB values between 200-230 on white with 10-20 on black are best.

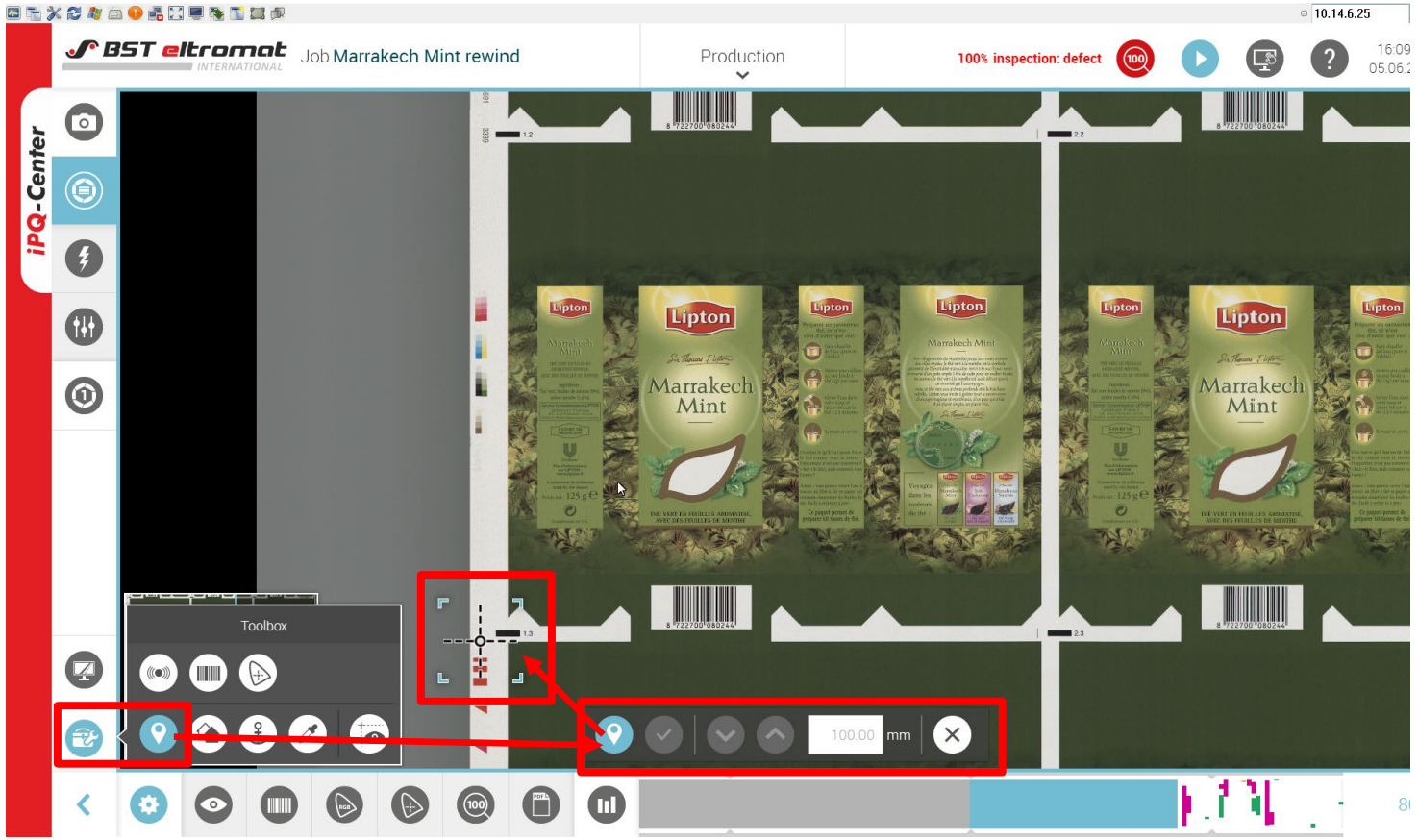
Higher RGB values than 250 is critical. Also the “quality” of the learned reference picture is important.

//LED illumination selection and contrasts

Rules to setup LED illumination for 100% defect detection:

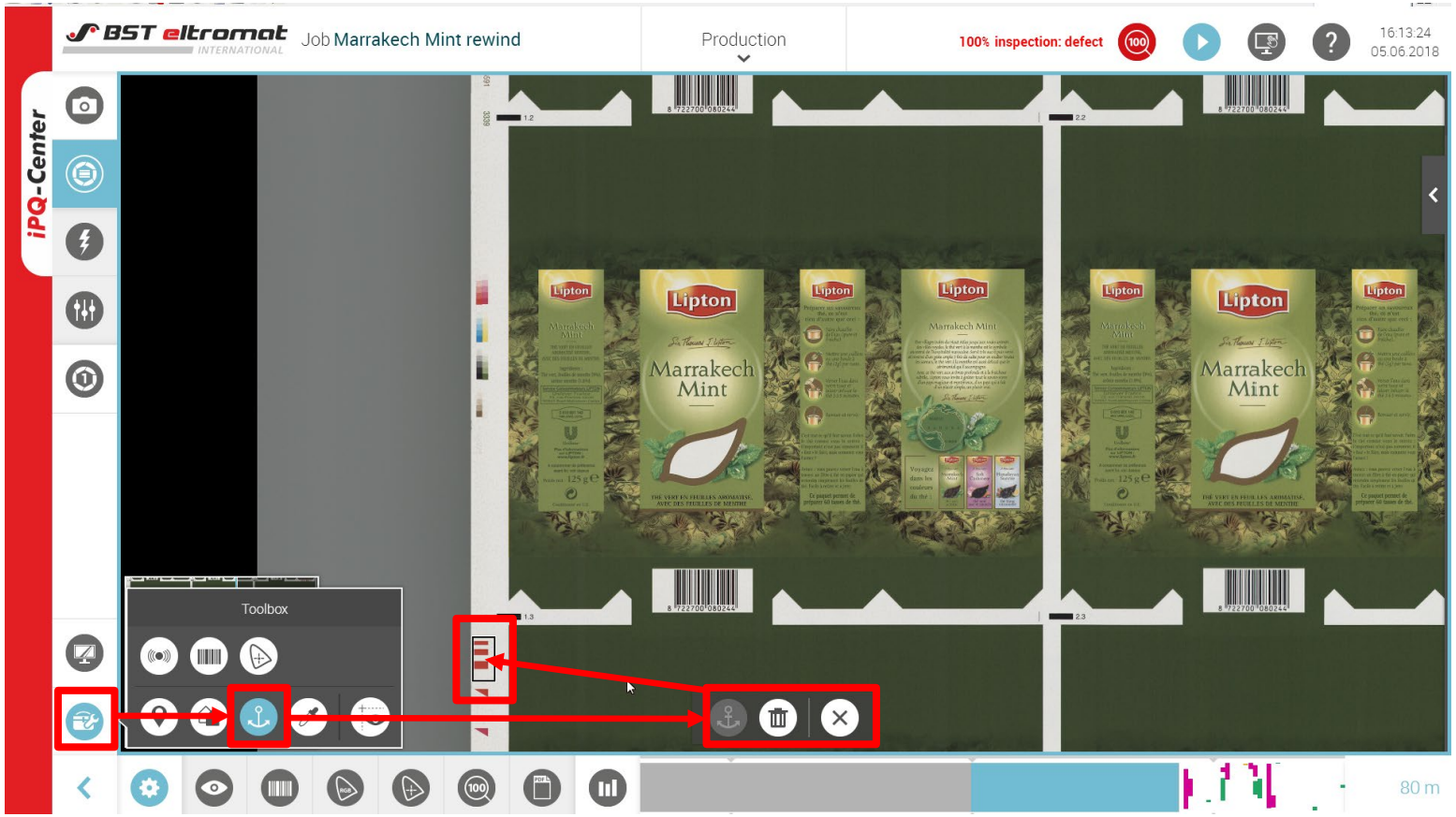
- Choose the best suitable LED illumination for the desired purpose.
- RGB values between 200-230 on white and 10-20 on black are best.
- Value higher than 250 are critical.
- Use pipette function to measure RGB values.
- Setup LED illumination before starting 100% learning phase.

//Adjust image position



Set the reference position according to the settings „reference position” from job preparation menue. This setting should be done before the reference image for 100% inspection is learned. If it becomes necessary to set it after activating the 100% inspection, the following steps need to be operated: stop automatic mode, delete reference image, set new needle position, activate 100% automatic mode. Please set in the way that both web edges will not be recorded from line chip cameras (to be verified in Sheet display).

//Set an anchor



Set the anchor position in the format. The anchor is needed to find back original image position after splice, out of print or other situations which change the image contents more than approx. 20%. The anchor should be set before one of these situations. See next page for criterias for a good setting.

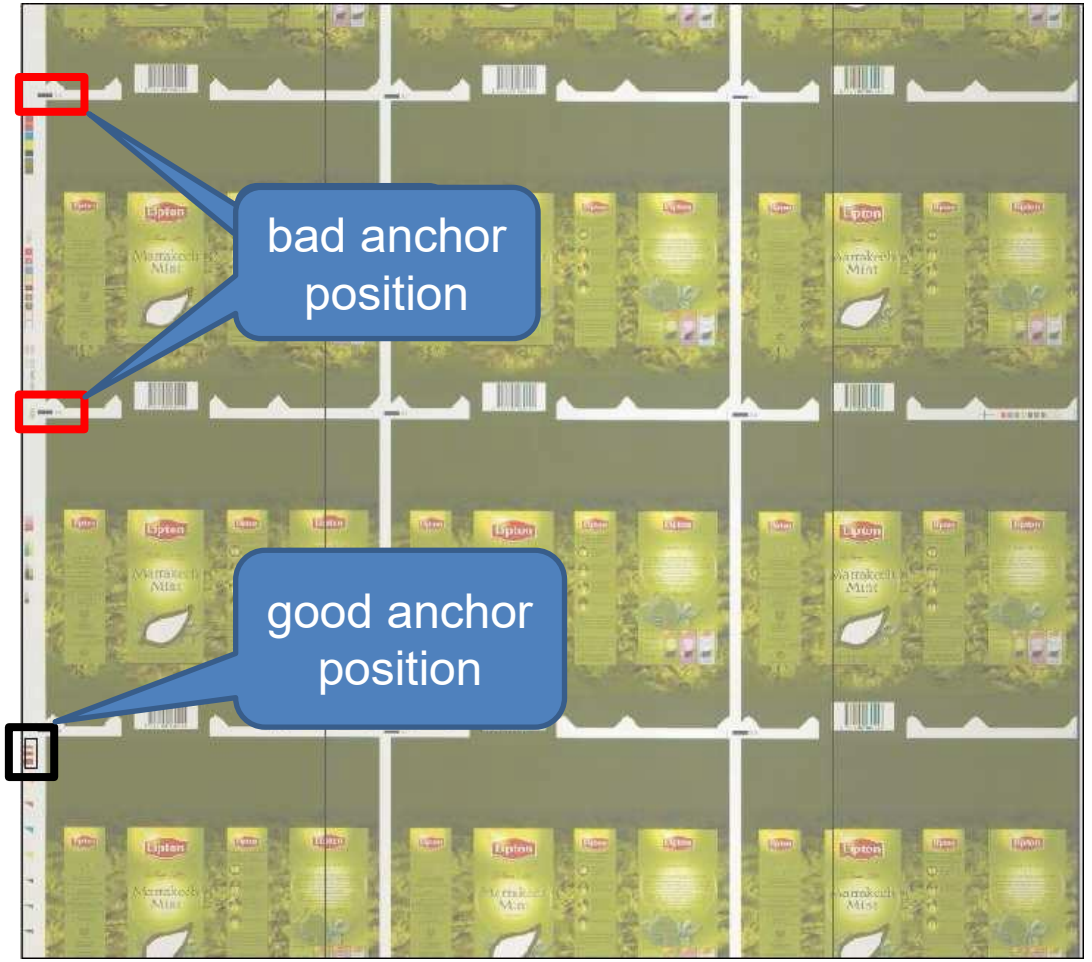
//Rules to set a good anchor

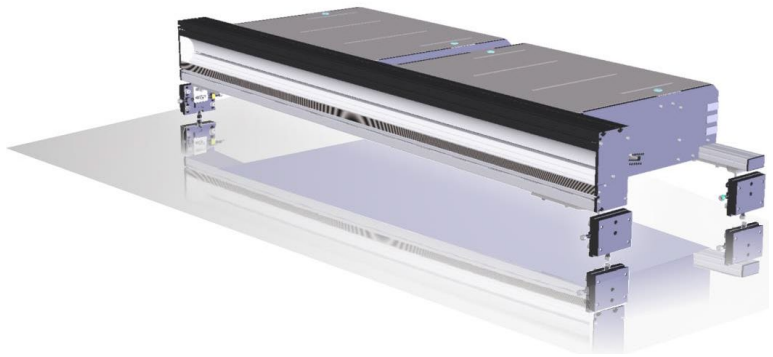
Select an area to set the anchor with the following criteria:

1. The anchor-window should be placed on a **unique** mark or display detail, not multiple in vertical format direction.

2. The anchor-window should have a **good contrast,** black on white would be best.

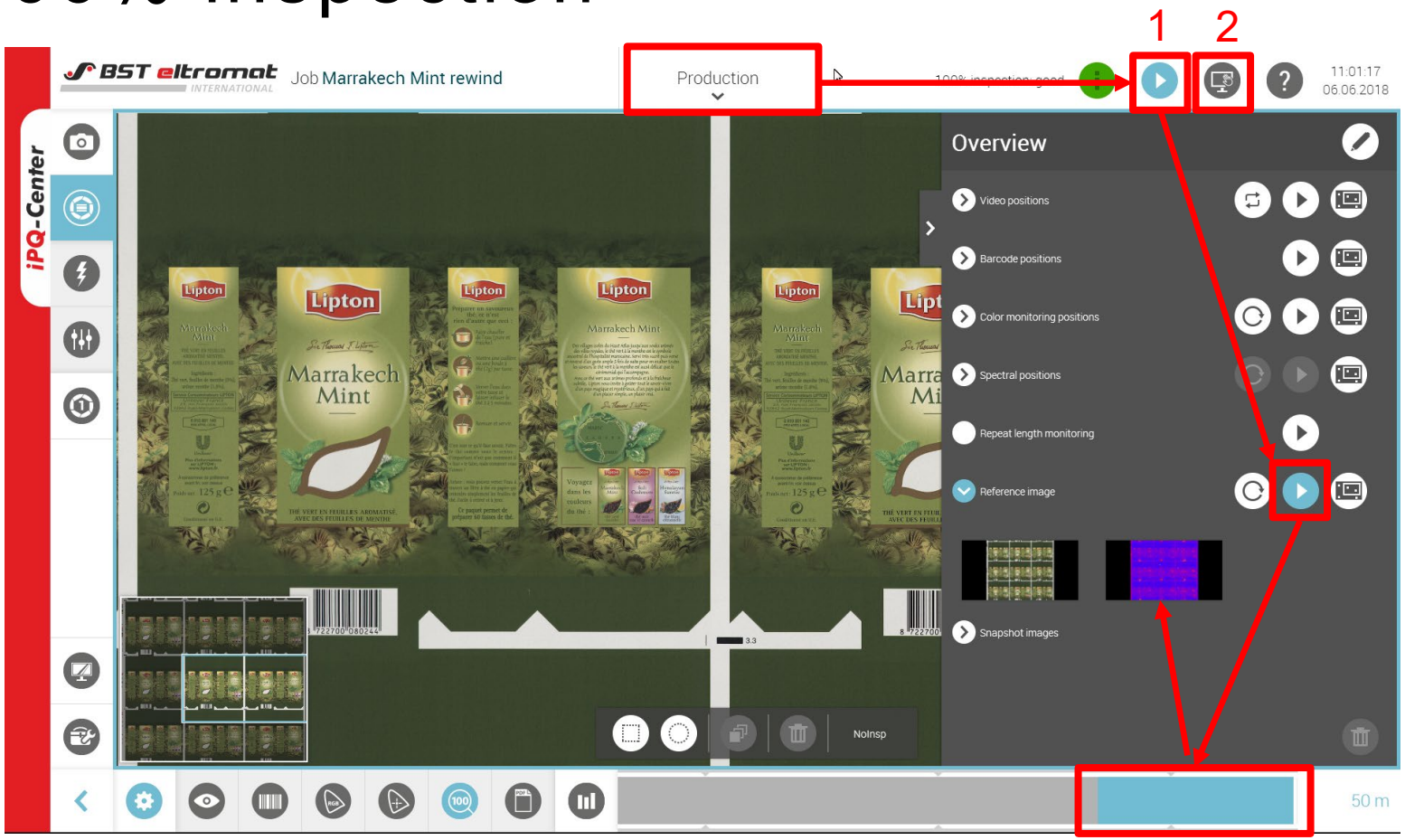
3. The anchor window should have **no register information** like in register crosses.





100% Defect detection

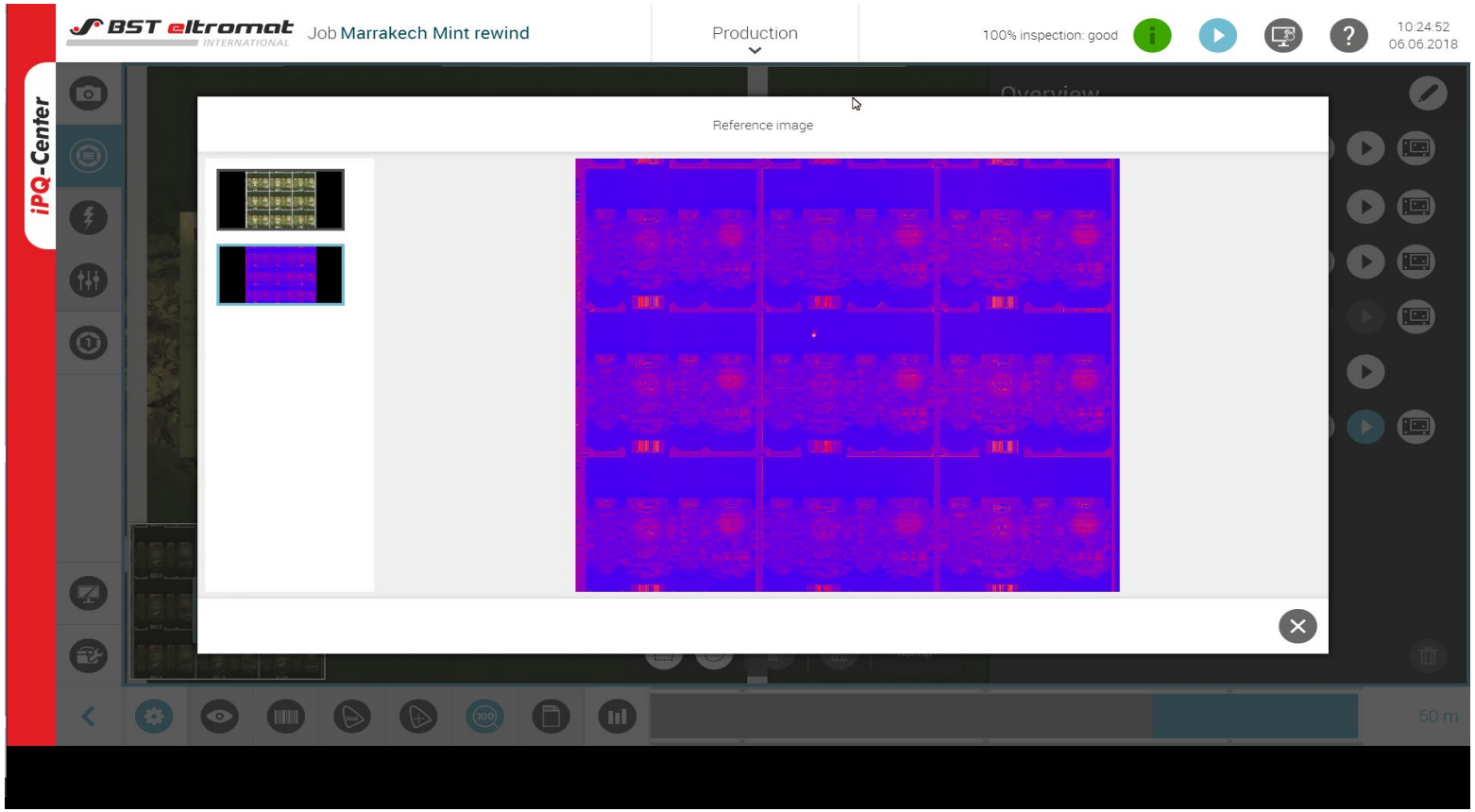
//Start 100% inspection



1. Activate global automatic mode to start learning phase. The reference image should be learned at production speed, with good printing quality.

2. Pause button to interrupt all traverse bar related automatic modes.

//Check reference image



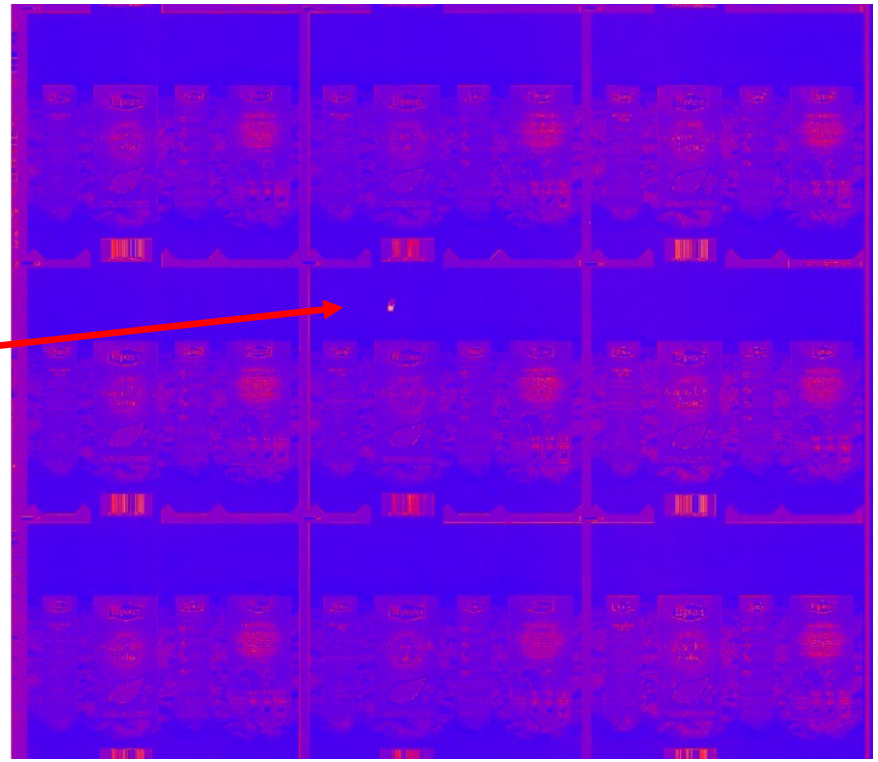
The reference image contains the learned production deviations. This is the basis for the 100% defect detection. 40 formats are learned by the system when starting the automatic mode.

//Reading reference image quality

Blue areas have a higher sensitivity, reddish or yellow/white areas have a lower sensitivity.

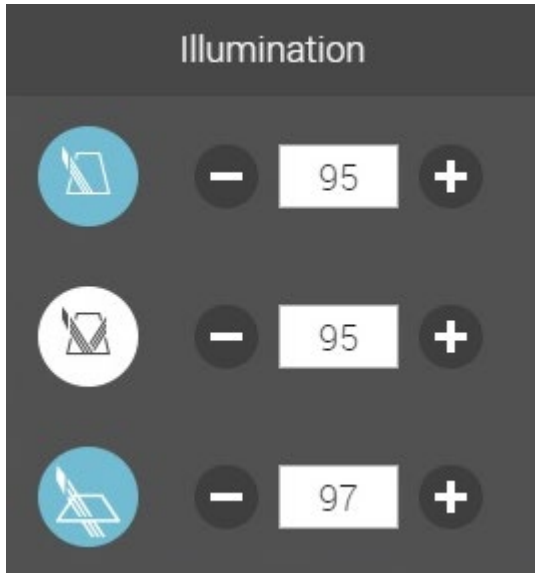
Example for a learned printing defect.

The same defect at the same position of the reference image will not be shown as a printing defect to the operator.

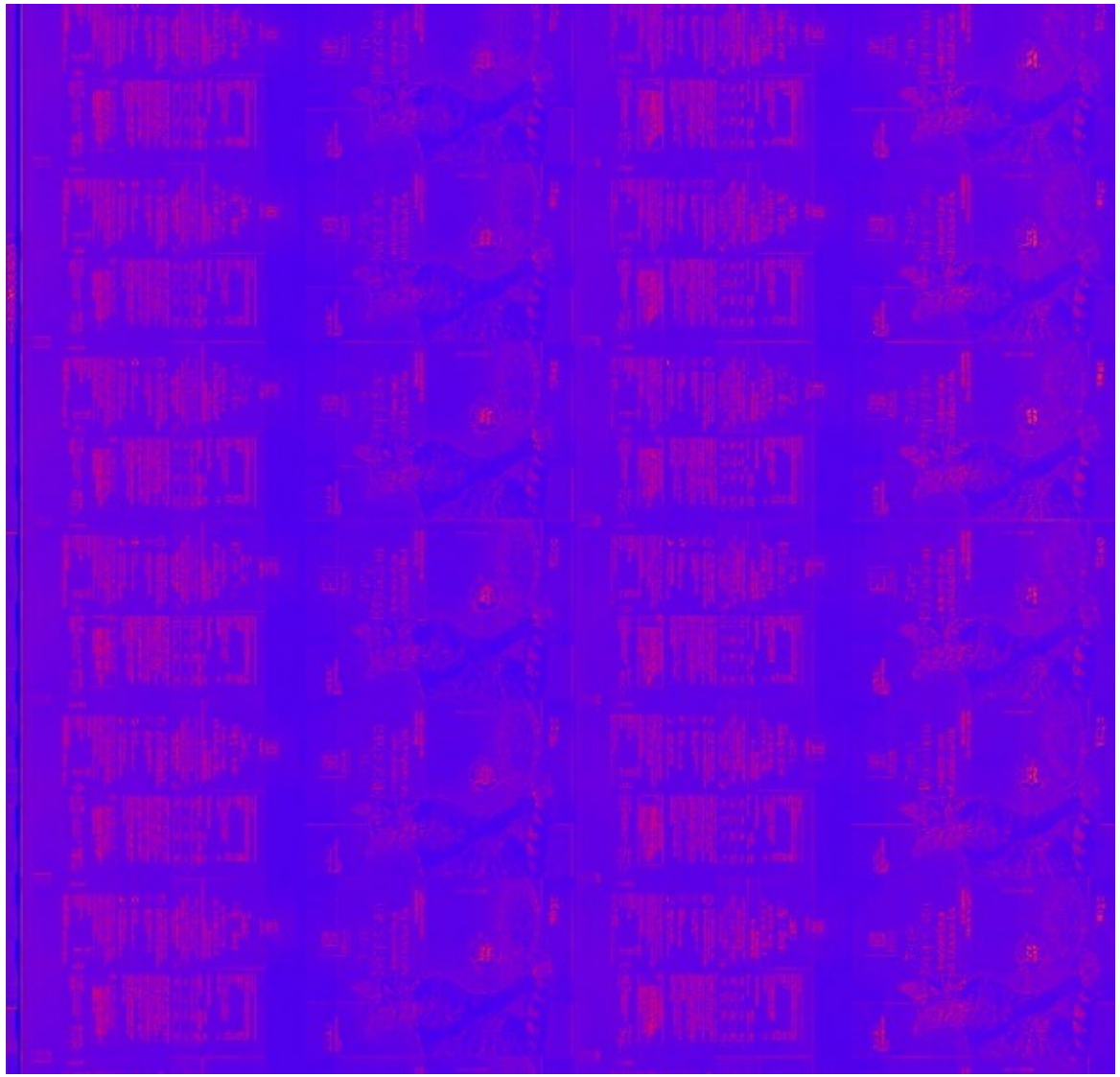


Recommendation: if a reference image contains too many learned defects: learn a new one. Also any time during the printing job, when the printout is changing: relearn a new reference image to be back close to “the original” with the inspection sensitivities.

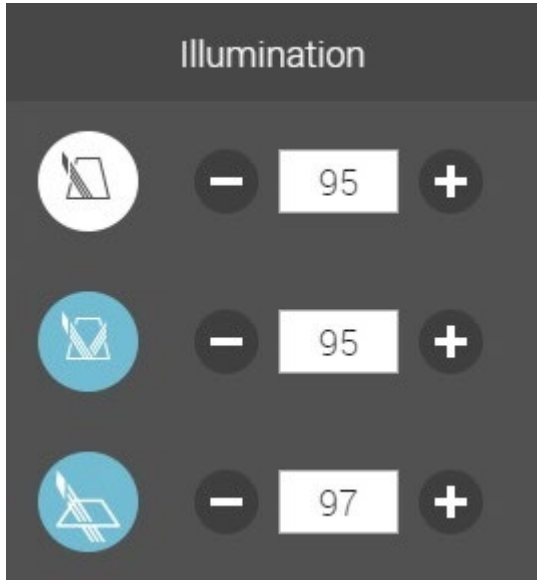
//Reference image quality by illumination selection.



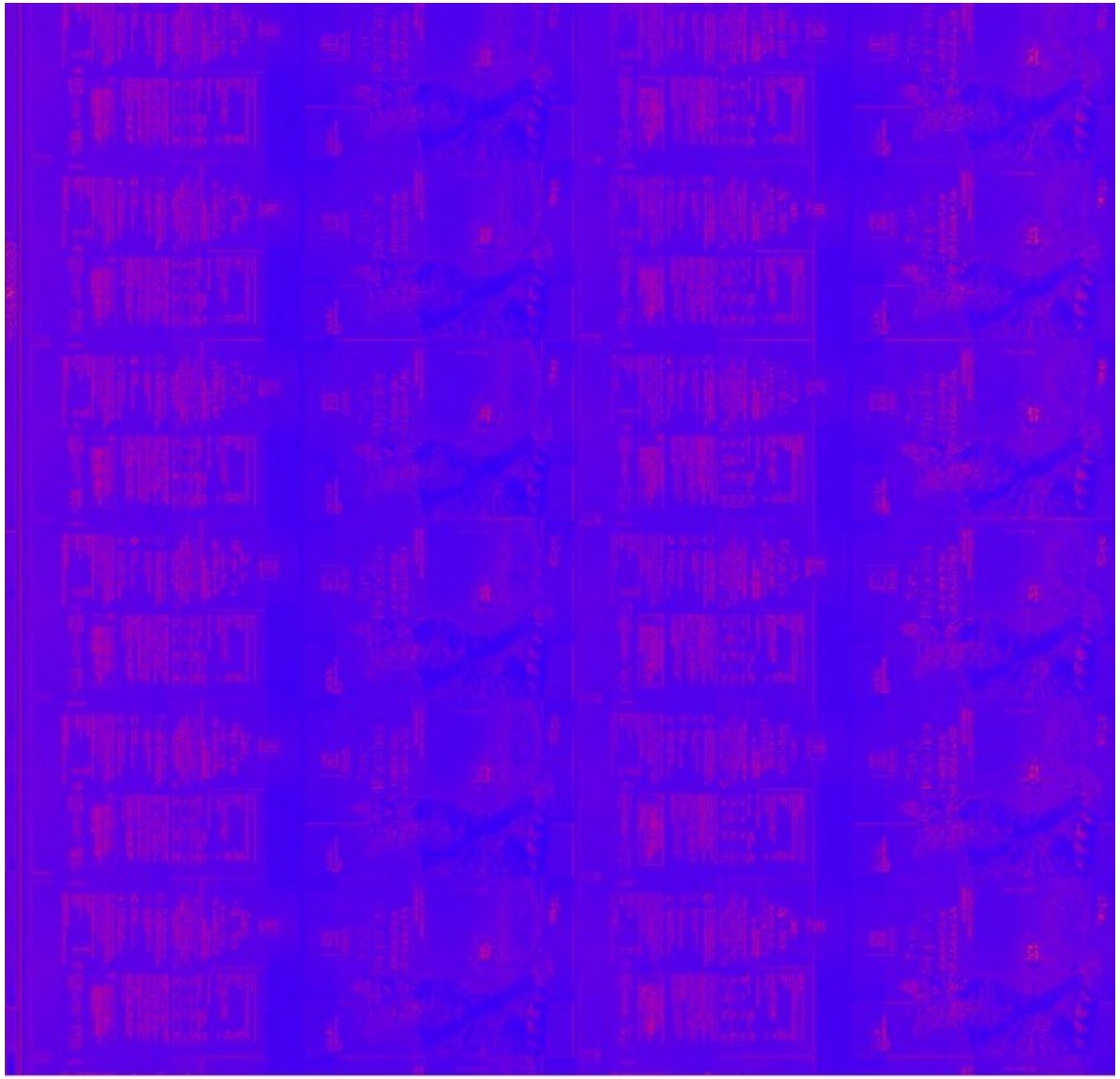
Reference image learned with default and translucent illumination. Many areas show red colors.



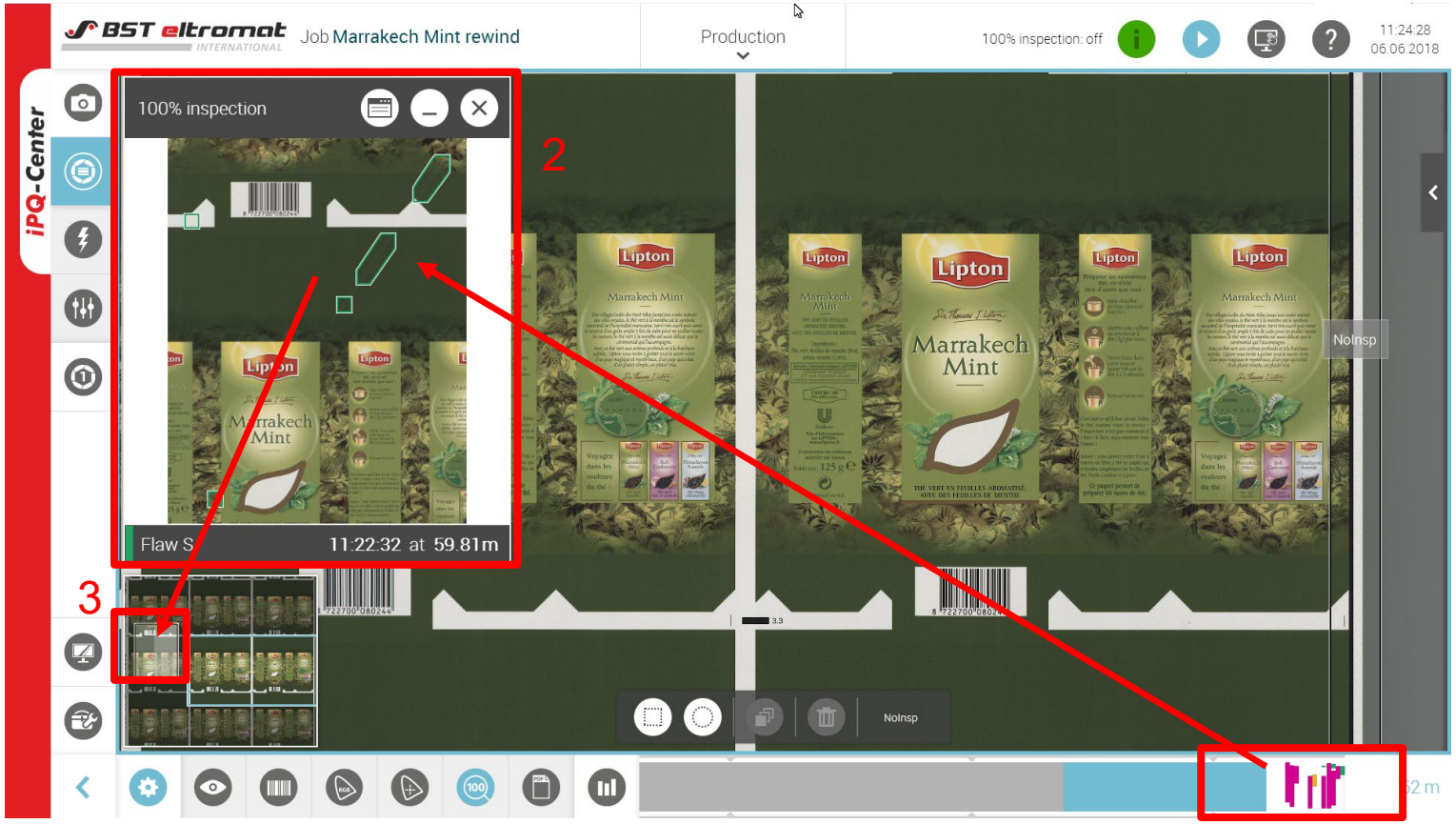
//Reference image quality by illumination selection.



Reference image learned from same material at same speed with different illumination.
Reference image shows less red areas, more blue, is more sensitive,“quiet” and with that much better for 100% defect detection.

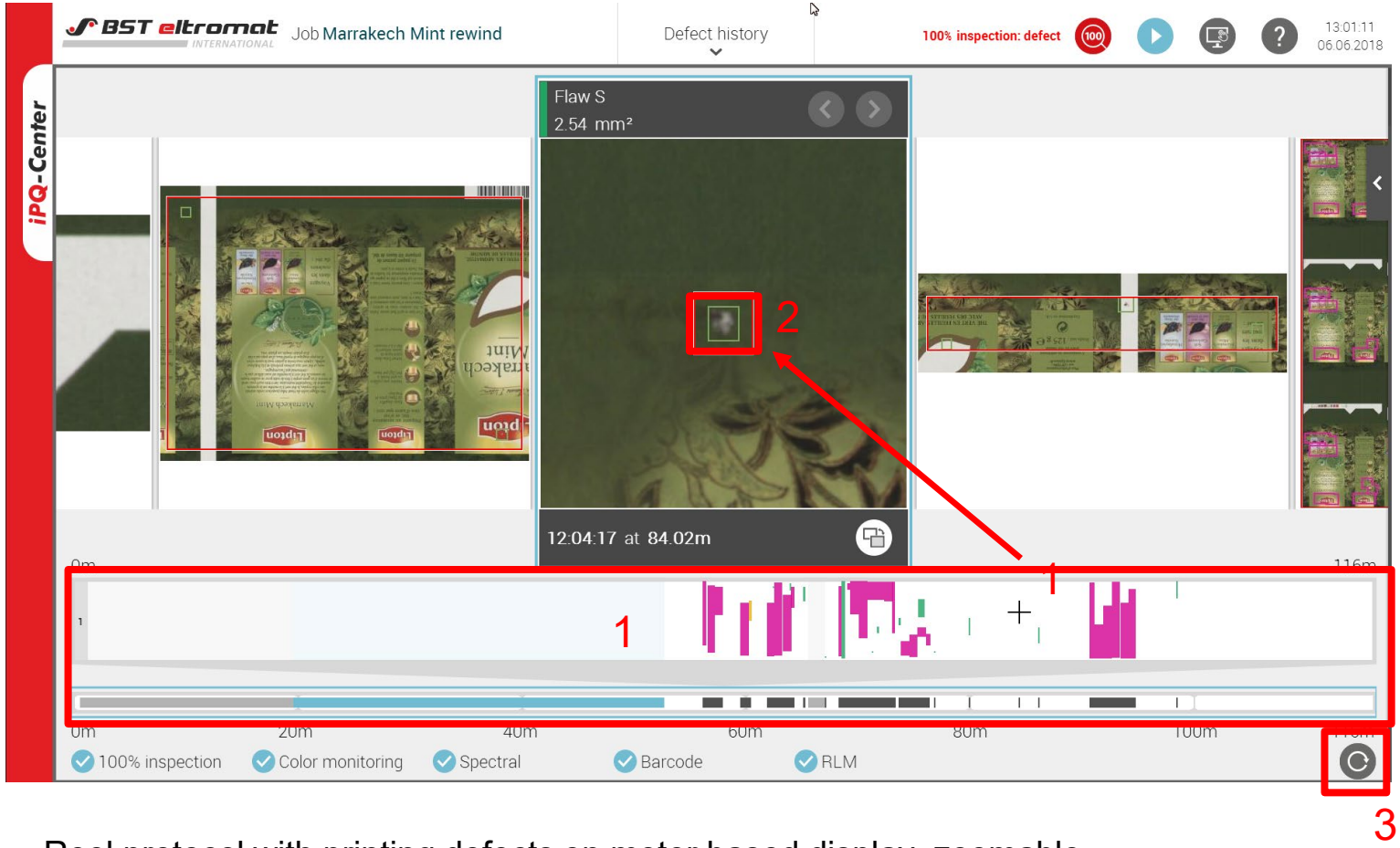


//100% defect detection



1. Defect history: quick view for the operator about the last 150 mtrs. of production.
2. Display of last detected printing defect. By doubleclick on this image the selected camera will zoom in to the center of this defect area.
3. Display of area where the defect origins from.

//The Defect history



1. Reel protocol with printing defects on meter based display, zoomable.
2. Selected printing defect with informations about class, size, time, meters. Click on it to see correlating area from learned reference image.
3. Refresh button to refresh Defect history.

//The coloured defect indicators

Defect history

- Defect History colors:

Light grey = system is not in inspection mode.

Cyan = system is learning the reference image.

White = system is in inspection mode.

Blue = Register print defects

Orange = Streak print defects

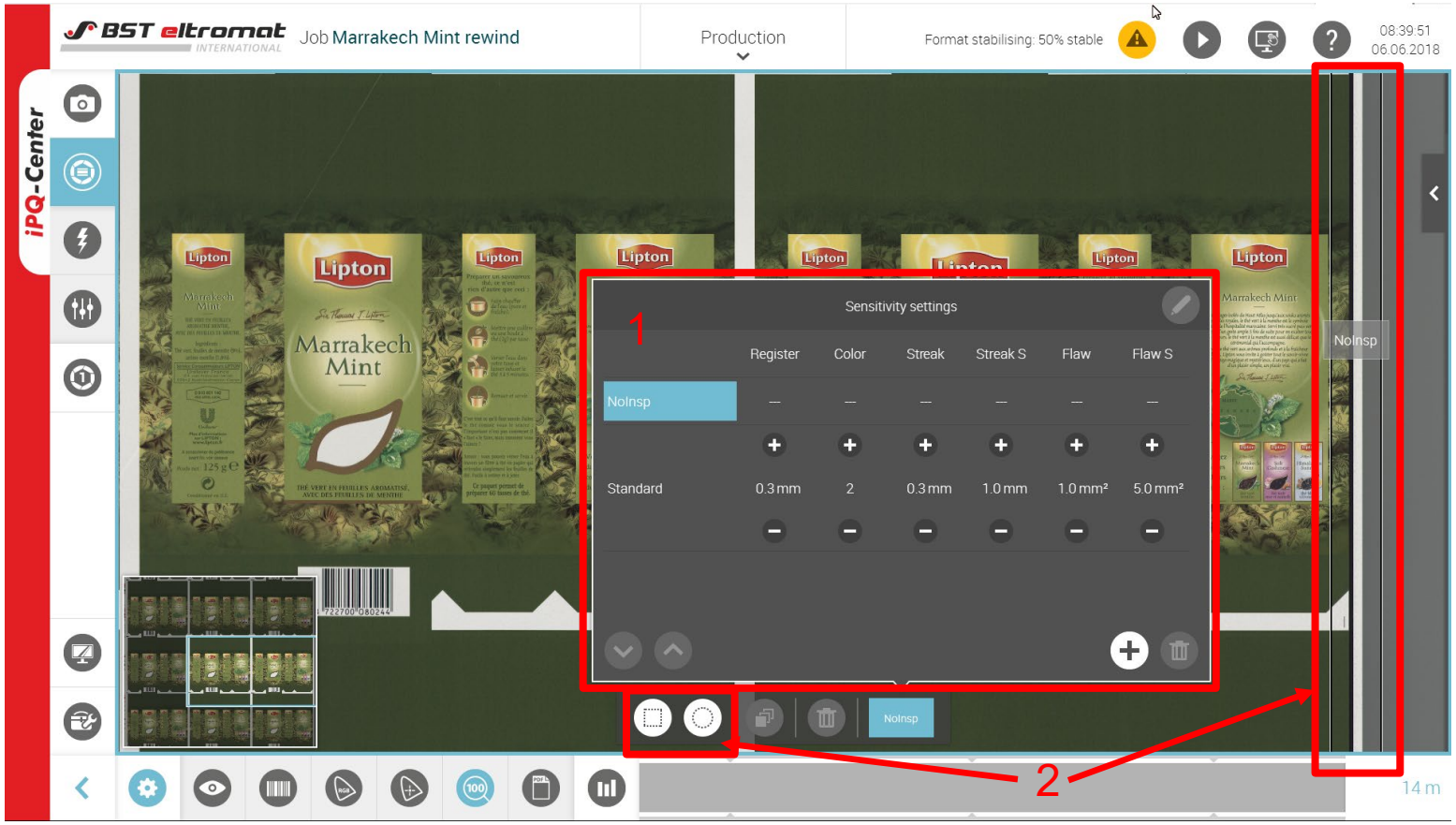
Pink = Flaw print defects

Violet = Colour print defects

Green = Sporadic print defects

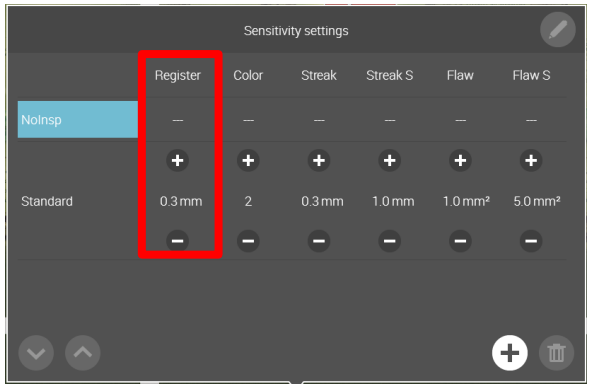
The colour indicators are a hint to the operator which defect class was found by the system. The operator must check (e.g. with Defect history menue or video image of defect) if the indication is correct.

//Operators sensitivity settings



1. Sensitivity settings for the operator. The „Standard“ sensitivities are working on the entire format.
2. Setting an inspection mask with different sensitivities then the Standard sensitivities.

//Register sensitivity



Example: “0,3 mm”

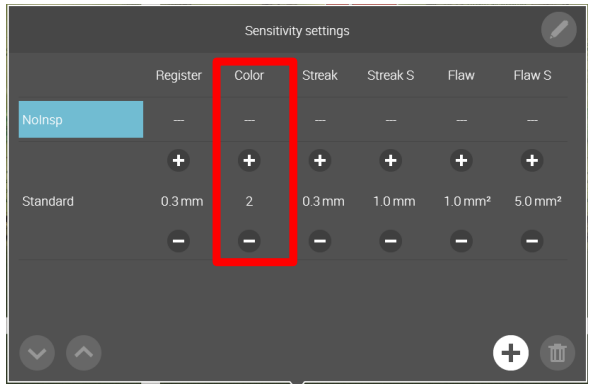
≥ 0,3 mm
Indication as register error

< 0,3 mm
No indication

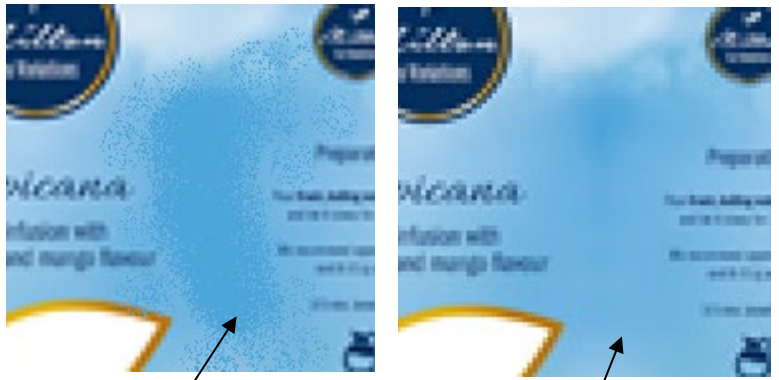
- “---” deactivates this sensitivity from print defect detection.
- “ALL” shows every deviation within the system resolution.

The Register-sensitivity is the threshold to display detected register deviations as print defects to the operator. This print defect must be in repetitive formats on the same position.

//Color sensitivity



Example: 1



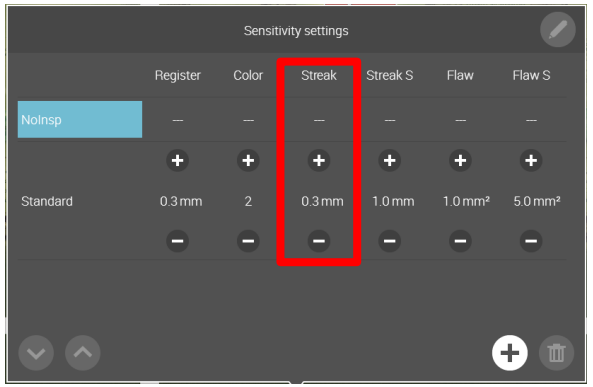
≥ 2
Indication as “color”

< 2
No indication

- “---” deactivates this sensitivity from print defect detection.
- “ALL” shows every deviation within the system resolution.

The Color-sensitivity is the threshold to display color changes to the operator. The print defect must be in repetitive formats on the same position. If not, it would be classified as a sporadic defect. The values are not spectral deltaE-values. The detection is based on the RGB-line chip camera sensor.

//Streak sensitivity



Example: 0.2mm

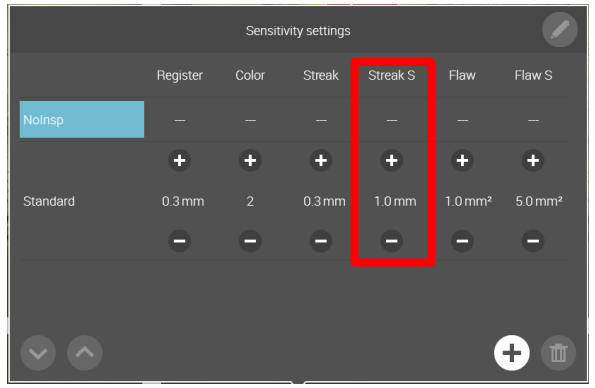
≥ 0.3mm
Indication as streak

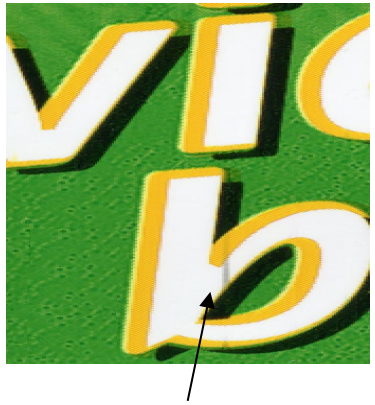
< 0.3mm
No indication

- “---” deactivates this sensitivity from print defect detection.
- “ALL” shows every deviation within the system resolution.

The Streak-sensitivity is the threshold to display streaks, doctor streaks, sometimes register deviations at print edges to the operator. The print defect must be in repetitive formats on the same position. If not, it would be classified as a sporadic defect.
The detection is based on the size and on the contrast of the print defect.

//Streak Sporadic sensitivity



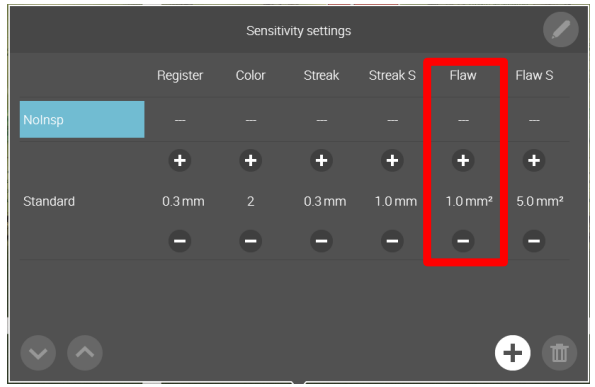


Indication as Sporadic Streak defect

- “---” deactivates this sensitivity from print defect detection.
- “ALL” shows every deviation within the system resolution.

The Sporadic Streak-sensitivity is the threshold to display streaks, doctor streaks, sometimes register deviations at print edges to the operator. The print defect must be a single defect: it appears on continuous changing positions, or on not repetitive formats. The detection is based on the size and on the contrast of the print defect.

//Flaw sensitivity



Example: 0,5 mm²

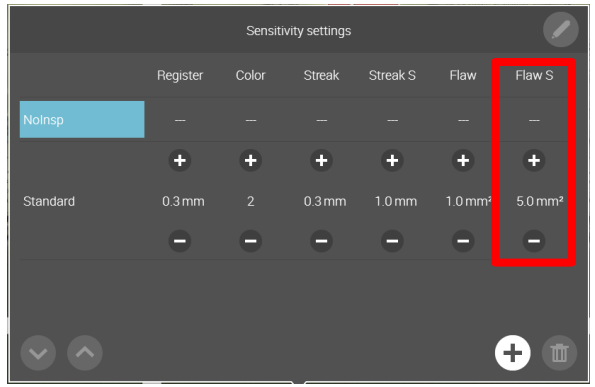
Indication as “Flaw”

No indication

- “---” deactivates this sensitivity from print defect detection.
- “ALL” shows every deviation within the system resolution.

The Flaw-sensitivity is the threshold to display defects like misprint to the operator. The print defect must be in repetitive formats on the same position. If not, it would be classified as a sporadic defect. The detection is based on the size and on the contrast of the print defect.

//Flaw sporadic sensitivity



Indication as sporadic defect

Right side: recycled material spots

- “---” deactivates this sensitivity from print defect detection.
- “ALL” shows every deviation within the system resolution.

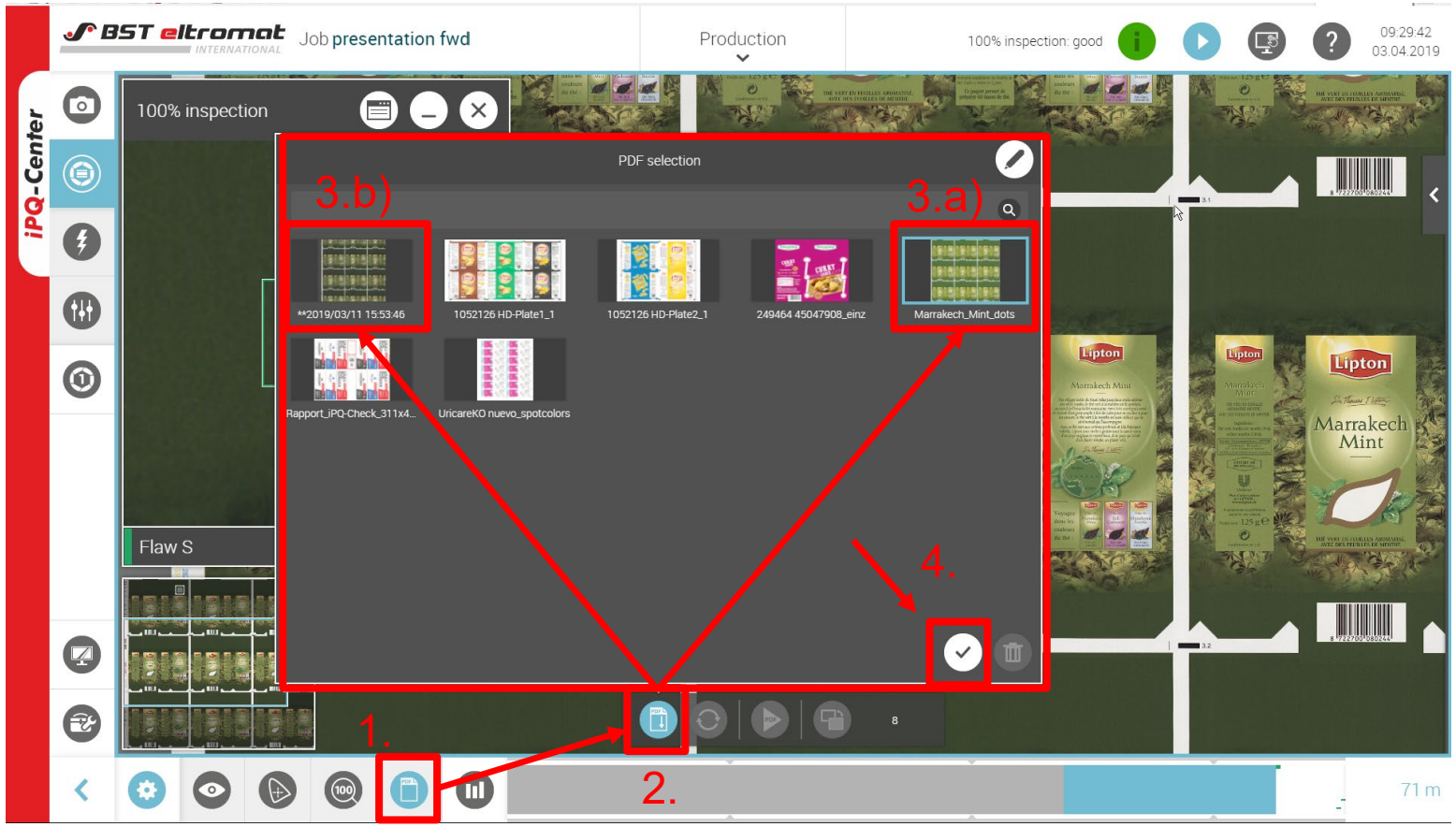
The Sporadic Flaw-sensitivity is to display surface defects like misprint or ink spots. The print defect must be a single defect: it appears on changing positions, or on not repetitive formats. The detection is based on the size and on the contrast of the print defect. Also material defects can be discriminated up to a certain amount per repeat.

PDF Plate Auditor

//PDF Plate Auditor overview

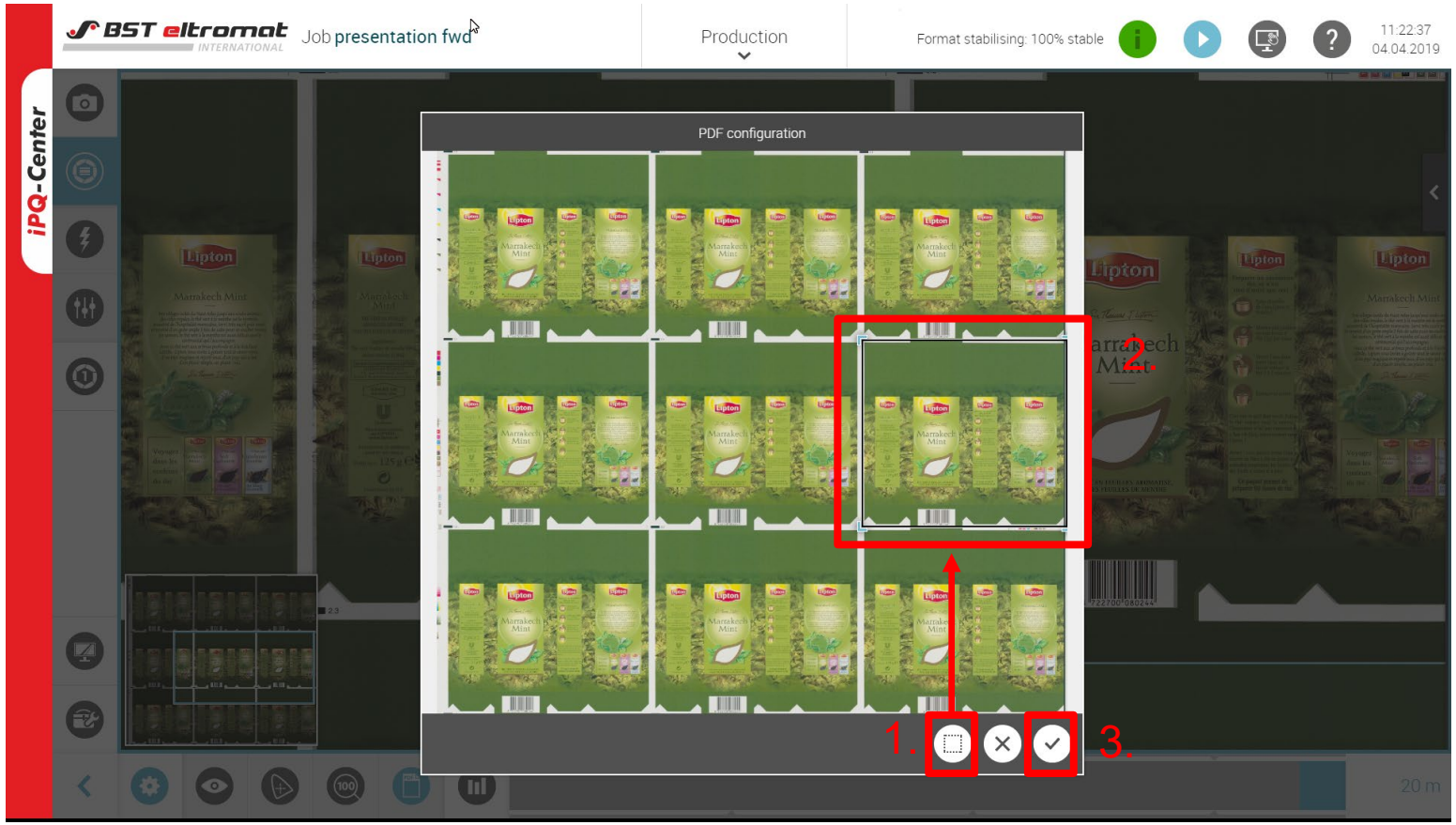
- The PDF-Plate Auditor fills up the gap in quality control between the design of the PDF to the production in the machine. (Cylinder manufacturing, transport, storing, mounting, etc…)
- A PDF is compared to the live image.
- PDF data is be loaded from external into the iPQ-Center.
- The checking can be proceeded at a standing still or running at machine.
- The PDF-Plate Auditor shows print deviations, the operator is responsible to decide what is good or bad print quality.

//PDF Plate Auditor operation



1. Open the function PDF Plate Auditor.
2. Select the menue „PDF-Catalog“.
3. Select a) an uploaded PDF or b) a PDF from a reference image.
4. Accept your selection.

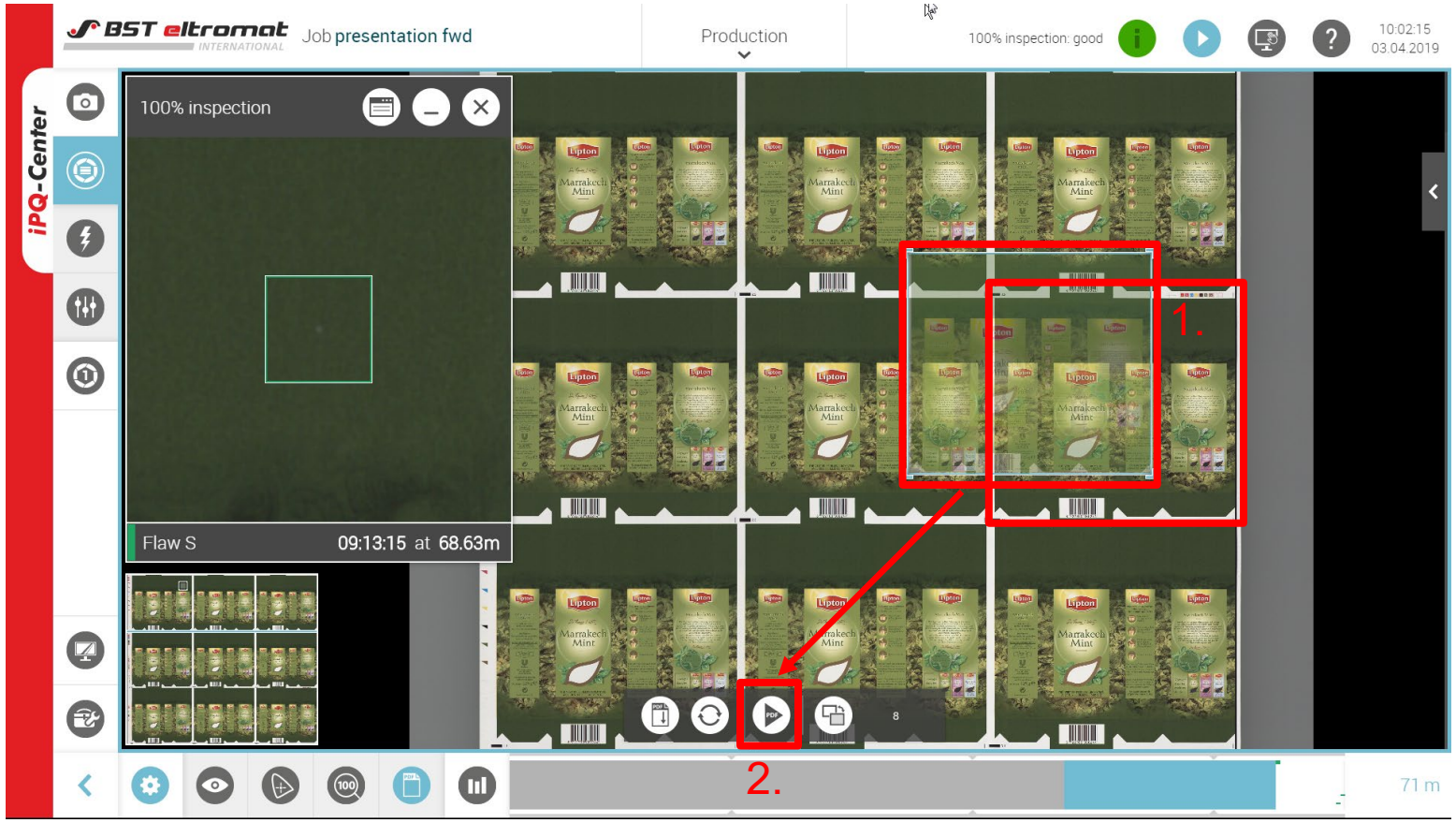
//PDF Plate Auditor operation



There is the possibility to select the entire PDF or an area of the PDF. This is to respect possible Co-printing jobs with different designs within one print format.

1. For comparing areas only: select the „area“ function.
2. Mark the desired area in the PDF which you want to use for the PDF Plate Auditor function.
3. Accept your selection.

//PDF Plate Auditor operation



1. Position the selected PDF-area rough on the live image.
2. The PDF-area will „snap in“ to the live image with the start of the PDF Plate Auditor automatic button.

//PDF Plate Auditor operation

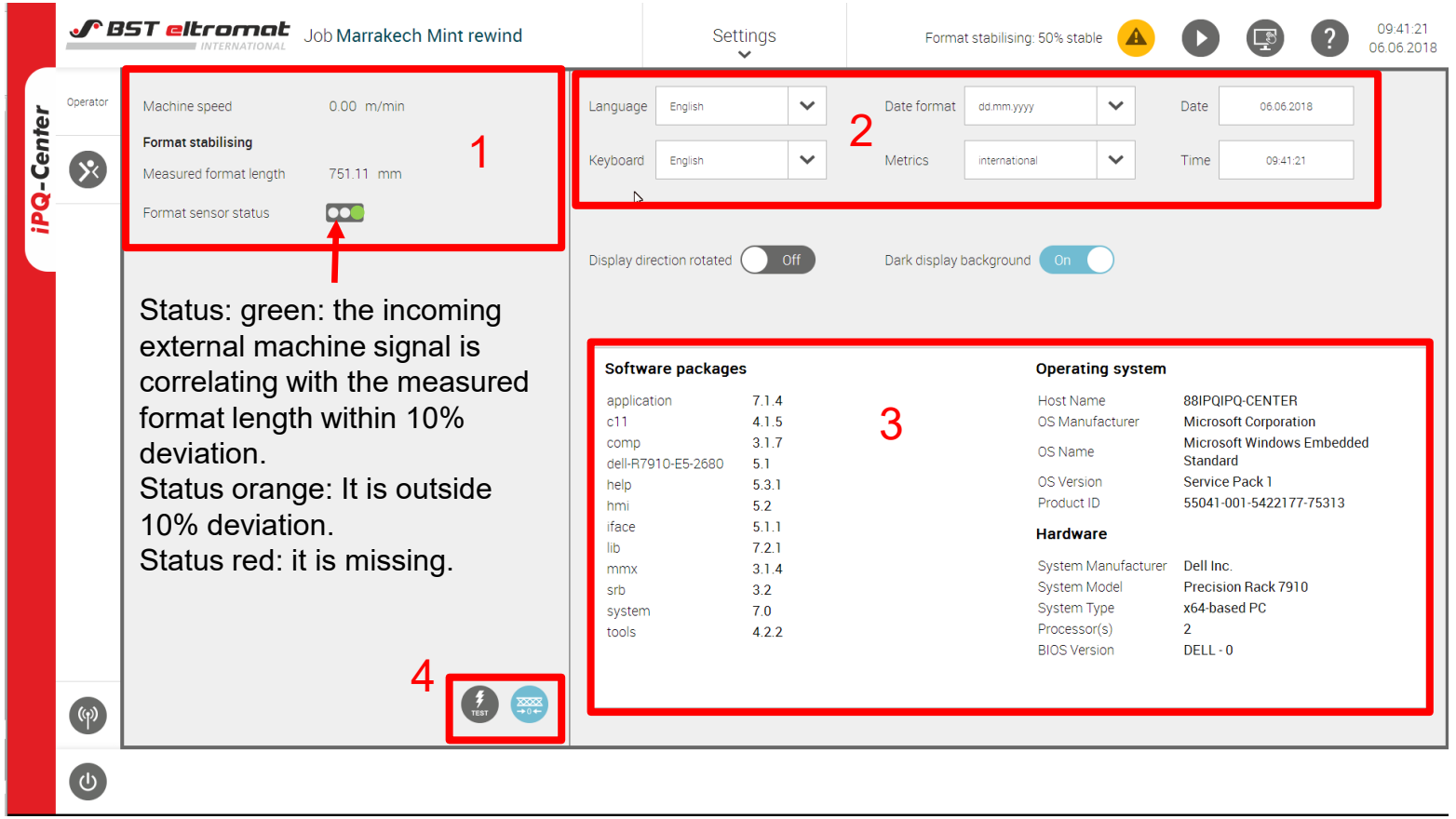
1. By moving the slider „Deviation“ the „sensitivity of the PDF Plate Auditor is set up.
2. Set up the “Deviation”: Higher values: the deviation in print must be bigger to be displayed. Lower values: the deviation in print must be smaller to be displayed.

//PDF Plate Auditor operation

1. Example for missing text, print / damage of cylinder or plate, displayed by the PDF Plate Auditor.

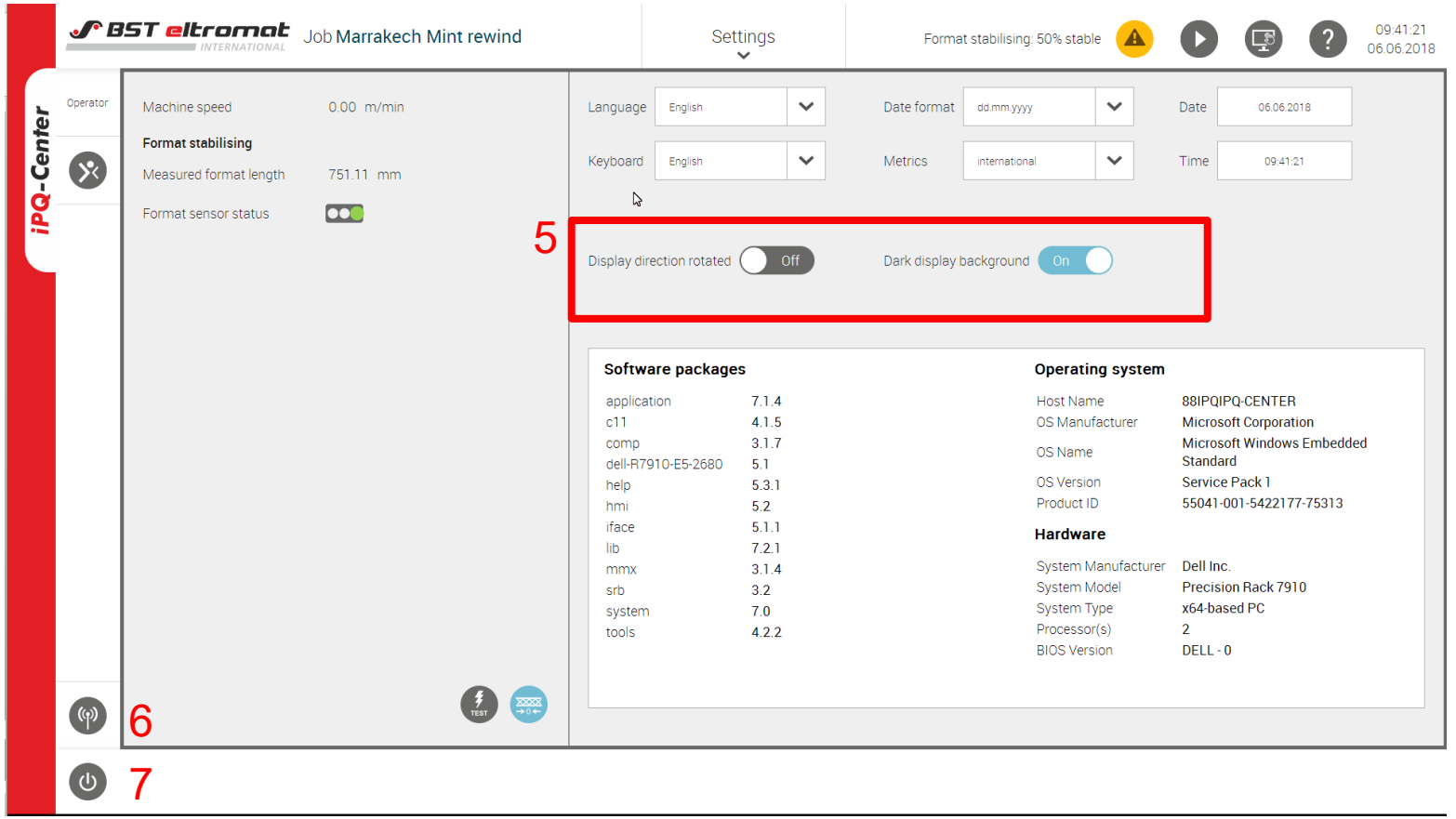
Service menu

//Service menu settings for operator



1. System status indication. System calculated machine speed, measured format length and Format sensor (external format signal).
2. Opertors basic system settings.
3. Software and hardware information for telephone support purpose.
4. Test flash for traversing camera / traverse bar calibration after system start.

//Service menue settings for operator



5. Display settings: image rotation on the operators monitor and white/black background for image on operators monitor.
6. Activate remote service, call helpdesk for assistance.
7. Restart PC. Attention: a complete restart with system mainswitch is better.

//Recommendations about chronologic setup

1. Setup / load / edit job
2. Adjust line chip camera image
3. Activate 100% automatic mode
4. Check reference image
5. Set anchor position
6. Proceed a pdf-comparison
7. Check / finetune sensitivities
8. Activate / use others (modules / functions)
9. Take job out (option protocol will saved)

BST GmbH
Remusweg 1
33729 Bielefeld, Germany

BST.TrainingCenter@BST.GROUP

Please scan the following barcode with your mobile device
to give us a five minute feedback about this training document.