This tutorial is based upon basic knowledge on CPM's, please consult the online tutorial "Calibrated Printing Modes" available from the Asanti Network!

A Calibrated Printing Mode (CPM) is a quality resource that is associated with the 3 major ingredients of a job: the printer that will be used to print it, the media on which it will be printed and the desired quality of the printed result. Asanti comes with default installed CPM's for "Generic" media, these are originally made on a bright standard media. They have a big color gamut which makes them very suitable as base CPM to derive new CPM's from. New CPM's can be created starting from an existing CPM (=base CPM) using the CPM Wizard. **It's strongly advised to use the Generic CPMs as base.**

1. Creating a derived CPM

1. In the jobs overview, context click on the digital press. Open the Media Hub.
2. Select File > New Media, give the new media a recognisable name (e.g. *Tutorial*)
3. Select File > New Calibrated Print Mode.

4. **Step 1** – Choose CPM Parameters or Link the Parameters

   - Select your Printer.
   - Select the new media that you created in step 2.
   - Select the Quality e.g. High Definition.

5. By default only the Agfa certified CPM's will be displayed.
6. Enable "Support printing color on media" to support direct printing of color on the media substrate (without pre-white). Click "Next" to proceed.
7. On the left pane on overview is give of the different steps that need to be done to complete the CPM. A green ✓ indicates that the step is finished.
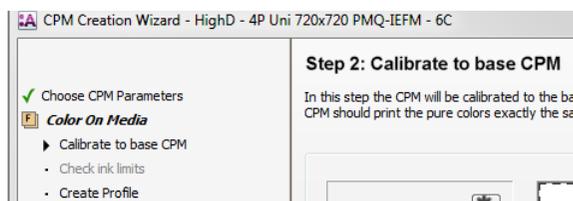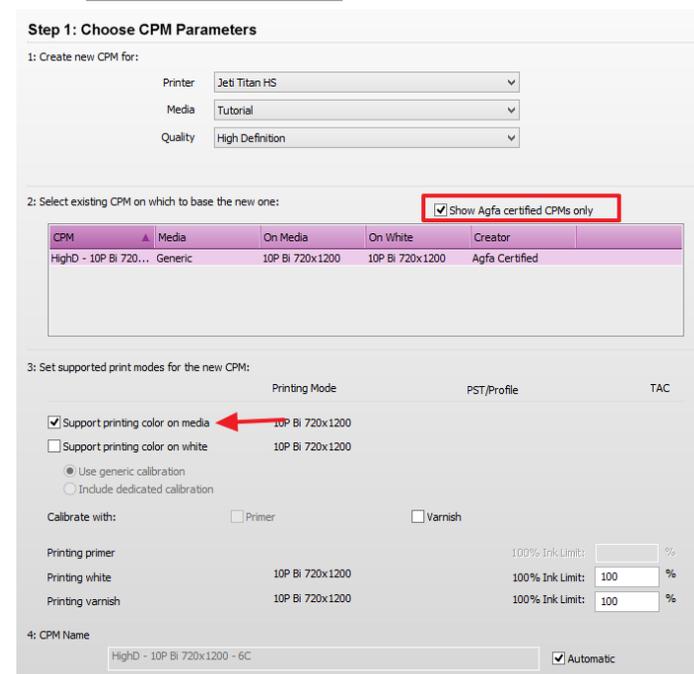
8. **Step 2** – Calibrate to base CPM.
   Select "Change Instrument" from the cogwheel when "NO
   INSTRUMENT SELECTED" is shown in the instrument pane.
   Select your measuring device e.g. EyeOne Pro 2.
9. Select Calibrate Instrument from the
   cogwheel.
10. Click "Print". The print target window
    will be displayed. The output size can
    be changed (this will rearrange the
    targets automatically). The print
    options with offset and media
    thickness is only useful for Jeti Titan
    devices. The wedge (ID strip and
    Calibration target) is automatically
    processed by Asanti and dispatched
    to the press after clicking "OK".
11. Change the number of measurements per row to 1.
12. Click "Measure" and measure the ID strip.
13. Afterwards measure the Calibration target. Each successfully measured row will
    receive a green state when completed (measure the row again when the red state
    stays visible)...
    Measurements can be reset, deleted or exported by context clicking on the wedges.
    It might happen that a warning "Calibration Failed" is posted. This means that the reference
    values for calibration from the base CPM cannot be reached with the new media type. Click
    "OK" to replace the reference calibration values with the actual measured values.
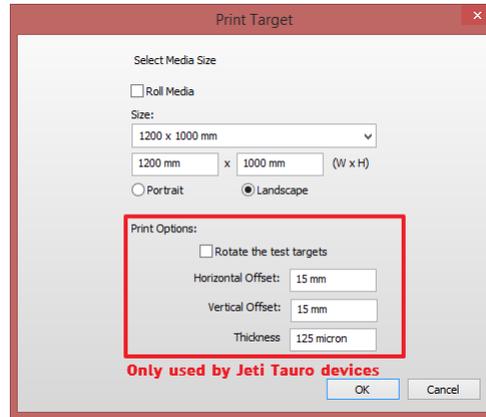
14. Click "Apply Calibration" to proceed and click "Next".
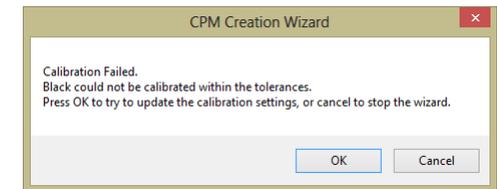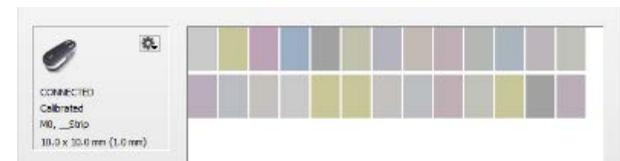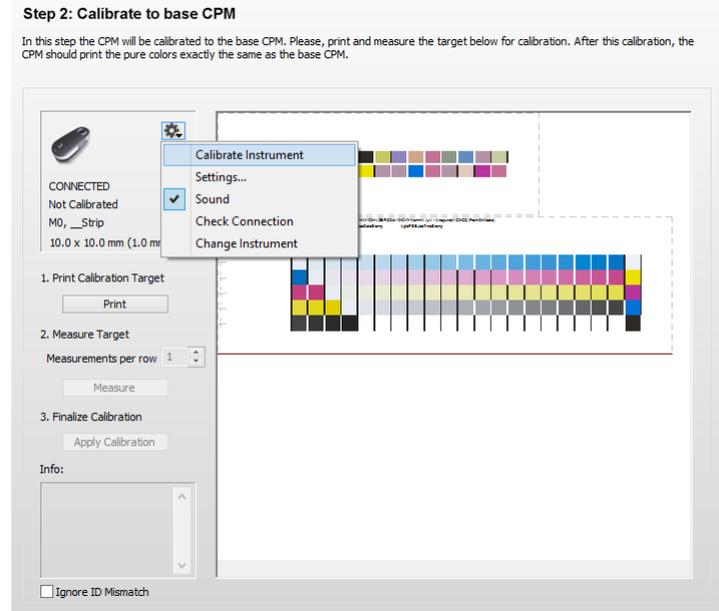
15. **Step 3** - setting the ink limits.
    A test page may be printed (by default Ink Limitations).
    Asanti contains a set of default test pages (depending on the application with additional white, primer or varnish).
16. Select the matching application and click print.
    The print can then be verified for unwanted artefacts such as brush banding, adhesion, stickiness ... Based on this result the ink limitation can be lowered for each individual ink or the total ink load can be reduced (TAC = Total Area Coverage). Reducing individual inks will reduce the maximum color saturation while lowering the TAC reduces the ability to print details in shadow parts.
    Red values indicate that the values from the base CPM can't be reached. This TAC will be taken into account for profile creation.
17. Click "Set Limits" if the limitations are changed. Then click "Next".
18. **Step 4** – Create Profile
    A profile can be created based on a full target or a limited target. The full target will create a completely new profile for this CPM.
    A limited target will intelligently combine the measured results of a small target with the profile of the base CPM. The new profile will then be created while combining these measurements with the base CPM profile.
19. Select "Limited Target" and click Print. Do not make any changes in the Print Target dialog and click "OK".
20. Print the target. Notice that the limited target uses a significant amount of neutral grey patches. The grey balance will be used to match the base profile with the new media.
21. Click "Measure" to start measuring the ID strip and the Profile target.
22. Click "Create Profile" when all rows have been successfully measured.
23. Click "Finish" to close the CPM Creation Wizard.
24. Your new CPM will now be shown in the Media Hub. The creator of the CPM will be "CPM Wizard". You may rename the CPM in the Media Hub.

Step 3: Check ink limits

By calibration in the previous step, you made the new CPM print exactly the same for the pure colors as the base CPM. Maybe for the new media this might give some artefacts like banding, gloss change, etc. In this step you can print a test page to check if you need to limit the inks to avoid this artefacts. Please, select a target out of the list and perform a visual check of the printed result. If necessary you can enter ink limits in the fields below.

Test page: Ink Limitations (Jeti,Anapurna) [Print]

Ink limits:		Limited Solid:	Unlimited Solid:	Base Solid:
Max C	100	L 51.8	51.8	51.1
Max M	100	L 54.3	54.3	52.8
Max Y	100	C 90.6	90.6	90.6
Max K	100	L 20.2	20.2	15.7
TAC	300			

Set Limits

characterization target which guarantees you the best quality. Please, select the limited or full target, print and measure it and then create the profile to finalize the CPM.

CONNECTED
Not Calibrated
M0, __Strip
10.0 x 10.0 mm (1.0 mm)

1. Print Profile Target
   ○ Full Target
   ● Limited Target
   [Print]

2. Measure Target
   Measurements per row 1
   [Measure]

3. Profile Creation
   Profile Steering File:
   Use PST from Base CPM
   [Create Profile]
   ☐ Ignore ID Mismatch

2. Creating a derived CPM with dedicated white calibration

The Media Hub offers the option to add a "print on white" calibration. This can be a shared calibration (the generic calibration) or a dedicated calibration. In case of a shared calibration the "on white" printing resources from the base CPM are duplicated. The calibration for "on white" can normally be used for any media,

because the white ink layer has the same color on all media, and will normally also result in the same color gamut. Using shared calibrations for on white is simple: just enable "Use generic calibration".

A dedicated calibration just adds 3 additional steps to the CPM generation wizard:

- Calibration for on white
- Ink limits for white
- Profiling for on white

This exercise will learn how to add a dedicated white calibration to a derived CPM. For instructions to generate the "on media" calibration follow the steps described in exercise 1.

Keep in mind that white calibration (shared and dedicated) are only available when the base CPM contains a dedicated on white calibration, and when the ink set of the printer contains white ink.

1. In the jobs overview, context click on the digital press. Open the Media Hub.
2. Select File > New Calibrated Print Mode.
3. Step 1 – Choose CPM Parameters or Link the Parameters
   - Select your Printer.
   - Select the Media for which you want to make a CPM.
   - Select the Quality e.g. High Definition.
4. By default only the Agfa certified CPM's will be displayed.
5. Enable "Support printing color on media" to support direct printing of color on the media substrate. Also enable "Support printing color on white" and select "Include dedicated calibration".
   Click "Next" to proceed.
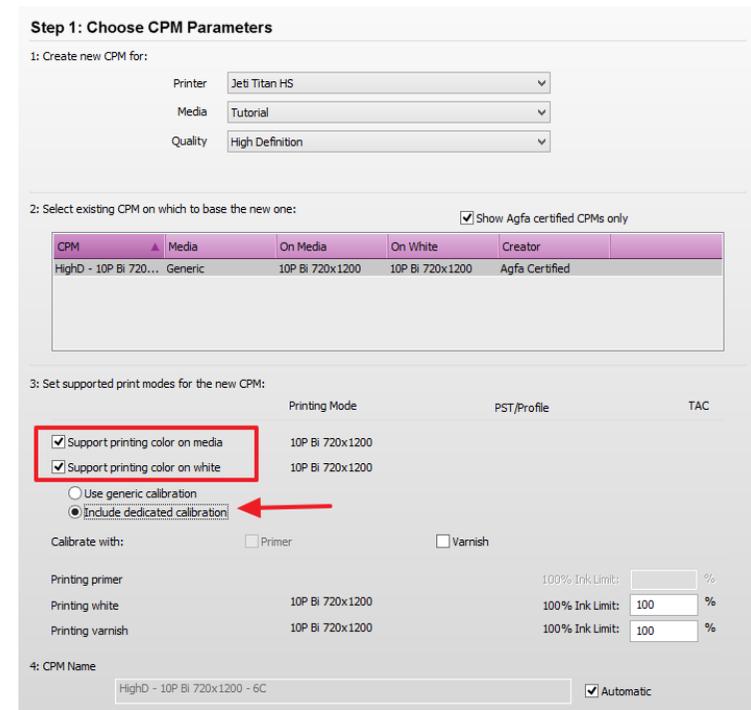
6. Notice the extra steps which are added to the wizard for color on white.
7. Follow steps 6 to 16 of the [Creating a derived CPM](#) exercise.
8. A second cycle will start when the calibration, ink limitation and profile is set for the "on media" calibration. The same actions will need to be taken for the dedicated "on white" calibration.
9. **Step 5**: Calibrate to base CPM. The calibration wedge is automatically generated with a white layer. The CPM wedges need to be printed pre-white. Not all engines pick this up automatically (Anapurna/Jeti Titan/Jeti Mira). Configure your engine accordingly.
10. Click Print and Click "OK" in the "Print Target" dialog. Eventually change media size and positioning if necessary (see previous lesson).
11. Click "Measure" to start measuring the ID strip.
12. Afterwards measure the Calibration target. Each successfully measured row will receive a green state when completed (measure the row again when the red state stays visible)...
    Measurements can be reset, deleted or exported by context clicking on the wedges.
13. Click "Apply Calibration" to proceed and click "Next".
14. **Step 6** - setting the ink limits.
    See also step 3 of exercise-1, now select the ink limits test page with the white layer included.
15. Click "Set Limits" if the limitations are changed. Then click "Next".
16. **Step 7** – Create Profile.
    Again see step 4 of exercise 1.
17. A CPM with a "Print on white" calibration is complete only if the on media calibration is also completed! If either of the calibrations are not finalized the CPM will show with a "Blue man" icon and cannot be used in a job.
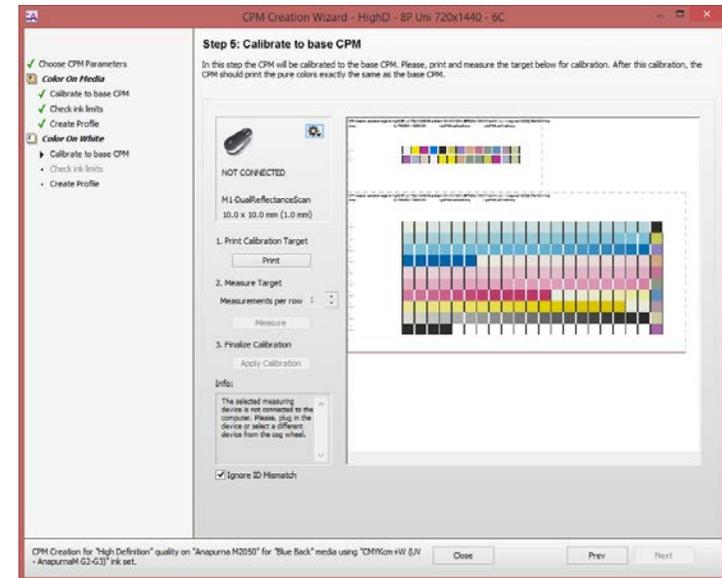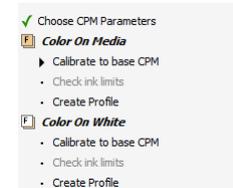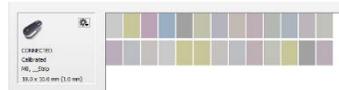
3. CPM with additional varnish

Varnish application allows to "enhance" prints to give the print a more luxury look. The varnish can cover the complete surface or only a part of the print (spot varnish). Applying a varnish layer will result in a different color behavior.

The selection of CPM needs to be decided per job. Spot varnish will not need a dedicated varnish CPM while completely covered varnish print may need a dedicated varnish CPM.

Creating a CPM with varnish capabilities is very similar to regular CPM creation. The only difference: varnish need to be enabled and a varnish ink limits target needs to be printed to set the ink limitation. Of course varnish needs to be present in the active ink set (see configuration wizard from the help menu)

1. **Step 1** – Choose CPM Parameters.
   The base CPM does not need to have varnish. The varnish color behavior will be integrated in the derived CPM during calibration and profiling for the new CPM.
   Enable the Varnish option.
   The CPM name will receive a "- V" suffix when enabled. The name can still be changed but it is advised to keep the "- V" suffix to distinguish varnish and non-varnish CPM's during job throughput.
   This is also the place to change the density of the varnish layer. The default value of 100% is a good starting point.

2. **Step 2** – Calibrate to base CPM.
   Print the target, measure the wedge and apply the calibration.
   Click "Next" to proceed.

3. **Step 3** - setting the ink limits.
Select and print the Ink Limitations with Varnish test page.
Notice that the background will turn bluish to indicate that the target contains a varnish.
Same approach earlier: red values indicate that the original values can't be reached.
If needed click "Set Limits" and click "Next" to proceed.

4. **Step 4** – Create Profile
A limited target can again be printed and measured. Click "Create Profile" to add the profile to the CPM.

5. The varnish enabled CPM is now ready for use.

4. Creating a derived CPM with a different measurement condition

To make substrates look "whiter" manufacturers add Optical Brighteners Agents (OBA). These agents reflects portions of the UV range into the visible light (fluorescence effect). This has an influence on the quality of the measurement which may cause unwanted color casts. Using a measurement device with an UV cut filter may fix certain casts but in general the results aren't satisfactory. The filters are not standardized and are more a "rough" way to compensate for the unwanted fluorescence effects. To cope with this matter an international agree standard is released: ISO1655.

ISO1655: Spectral measurement and colorimetric computation for graphic arts images

The ISO1655 standard standardizes how color measurements needs to be done. To standardize certain combinations (UV or polarization filters) measurement conditions are been introduced. This standardization allows to exchange data from different devices easily. If they use the same measurement condition the results will be the same. This was not the case in the past.

Measurement condition m0: the legacy

The current measurement condition: no adaptation or unknown. The measurement mode doesn't change anything to the spectral data. The m0 is the most common used practice today (all Apogee supported measurement devices).

Should be used for substrates without any OBA's.

Measurement Condition m1: the one fits for all

The m1 measurement condition is defined to reduce differences in measurements between devices as well as to compensate for the fluorescence effects (substrates or even inks). It is the advised way of measuring if possible. Take care, m1 measurements typically require a double measurement! 2 illuminants need to be used; the spectrophotometers which support m1 automatically calculate the correct spectral data from the different measurements.

Measurement Condition m2: UV cut filter

Measurements with the m2 factor simulates measurements with a UV-cut filter. These measurements are different from measurement with a physical filter since they use a standardized theoretical UV filter which influences the complete spectral range.

Measurement Condition m3: polarization filter.

Measurements with the m3 have a physical polarisation filter build in and are usable when measuring glossy surfaces to compensate for reflection erros.

Asanti and Calibrated Printing Modes

Measurement conditions do have an influence on color reproduction. It is important that the same measurement condition is used during each individual step of the CPM creation process.

Measurement conditions need to be supported by the measurement device. At this moment only the EyeOne pro 2 and the EyeOne iO 2 are capable to use measurement conditions. Older devices can still be used but only the m0 measurement condition will be used.

The m1 measurement conditions should be if available.

Creating a derived CPM with M1 measurement condition

The process of creating a derived CPM is almost identical. The wizard contains the same amount of steps but will act slightly different. Especially when the measurement condition from the base CPM is different of the derived one. This lesson will learn how to change measurement conditions and what to do when there is a mismatch in condition between base and derived CPM.

All default installed CPMs use the m0 measurement condition.

1. In the jobs overview, context click on the digital press. Open the Media Hub.
2. Select File > New Calibrated Print Mode.
3. **Step 1** – Choose CPM Parameters or Link the Parameters

   - Select your Printer.

   - Select the Media for which you want to make a CPM.

   - Select the Quality e.g. High Definition.

4. By default only the Agfa certified CPM′s will be displayed.
5. Enable ″Support printing color on media″ to support direct printing of color on the media substrate (without pre-white). Click "Next" to proceed.
6. **Step 2** – Calibrate to base CPM.
   Select "Change Instrument" from the cogwheel when "NO INSTRUMENT SELECTED" is shown in the instrument pane, Select your measuring device e.g. EyeOne.
7. Select Calibrate Instrument from the cogwheel.

8. In same cogwheel drop down list click Settings... In the ISO measuring mode select the M1-DualReflectanceScan mode and click OK to confirm.

9. Now click Print. The print target window will be displayed. The output size can be changed (this will rearrange the targets automatically). The print options with offset and media thickness is only useful for Jeti Titan devices. The wedge (ID strip and Calibration target) is automatically processed by Asanti and dispatched to the press after clicking OK.

10. Click "Measure" to start measuring the ID strip.

11. A warning will be posted when there is a mismatch between the measurement condition of the base CPM and the newly derived CPM.
Click "Yes" to update the default measurement condition of the new CPM.

12. Afterwards measure the Calibration target. Each successfully measured row will receive a green state when completed (measure the row again when the red state stays visible)...
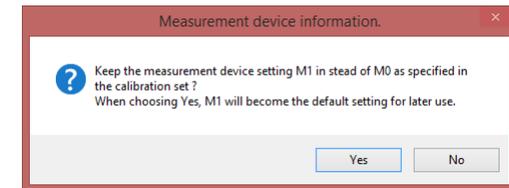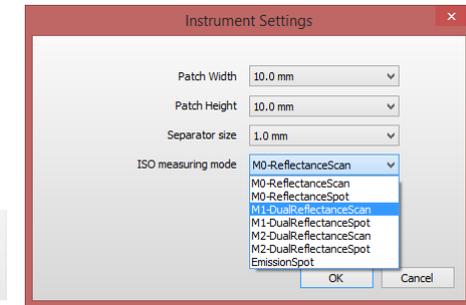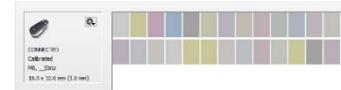
The m1 measurement condition needs 2 measurements per patch/row. Two light sources are used during this cycle: a "conventional" one and one with a significant amount of UV. This allows to calculate the influence of the OBA's.

*The **EyeOne iO 2** measures automatically but proper positioning needs to be cared off. Targets which needs to be measured m1 needs to be positioned as right as possible against the black line of the IO table (beyond this line no measurements are possible). The positioning itself needs to be properly in the center of the patches. Each row is measured twice but the head will lightly move between 2 measurements.*

*The **EyeOne Pro 2 handheld** needs to be measured from left to right (right indicator will light blue) and a second time from right to left (left indicator will light blue). Only after this 2nd measurement you may proceed to the next line.*

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13. Click "Apply Calibration" to proceed and click"Next".

14. **Step 3** - setting the ink limits.
see step 3 of exercise-1

15. **Step 4** – Create Profile
see step-4 of exercise 1 to finalize the CPM.

Pay attention: depending on the preferences of the client (earlier measurements) the measurement condition may be not in sync with the calibration. The client will post a warning to change the condition if this isn't the case.