Canon

HeightIQ

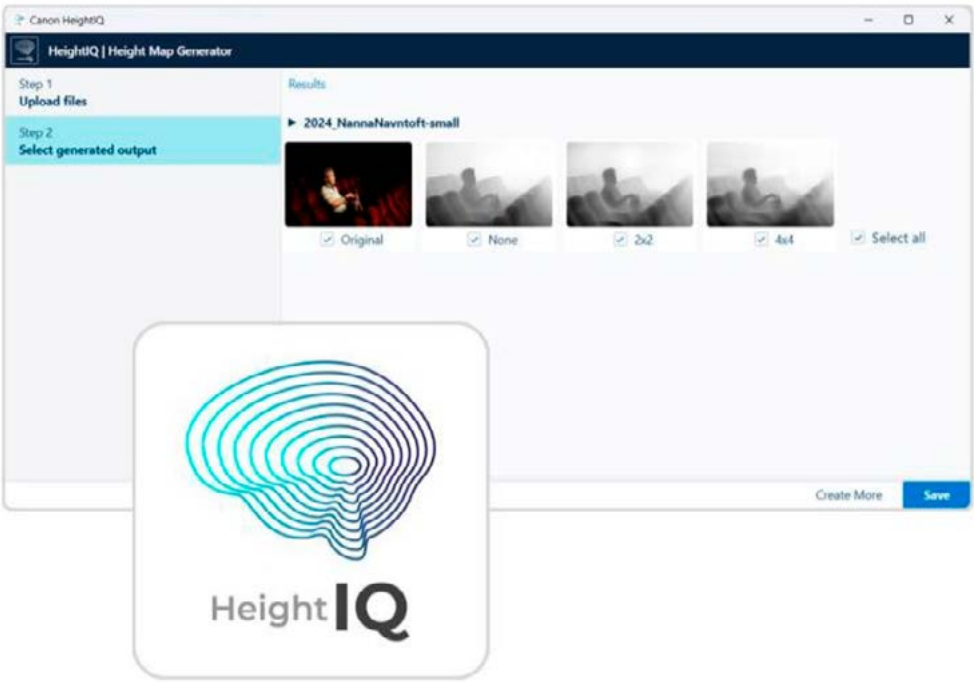
“How To” Tips for Using HeightIQ and Photoshop for Elevated Print Applications

INTRODUCTION

HeightIQ is Canon's breakthrough artificial intelligence (AI)-powered software utility that optimizes the creation of height maps from a 2D image to a 3D print application through PRISMAelevate XL software. The benefit to designers and PSPs is reduced production time and streamlined workflows for elevated print applications.

This brochure describes how to use HeightIQ in combination with PRISMAelevate XL, which includes the following main three steps.

1	Processing a 2D image in HeightIQ to produce a heightmap.
2	Using Adobe Photoshop[1] to add fine texture to the heightmap.
3	Combining the optimized heightmap with the original color image for use in PRISMAelevate XL.



Color input

HeightIQ

Optimized

[1] Subscription to a third-party service required. Subject to third-party cloud service providers' terms and conditions.

1 CREATING A HEIGHTMAP USING HeightIQ

HeightIQ uses advanced image recognition to analyze light, contrast, and shapes of a 2D image to produce a heightmap which can be used as a starting point for your elevated print application. When using HeightIQ, the input file should be a .jpeg with a maximum size of 10 GB.

Open HeightIQ and upload your source image

- Select your preferred “tile” setting. Tiling setting “2 x 2” and higher splits the image into multiple tiles which enables each tile to be processed separately. In principle, a higher tile setting gives more detailed results. However, this strongly depends on the original image. You can select multiple tiling options and HeightIQ will generate multiple images. Processing time will increase with higher tile settings. It is possible to upload up to 20 source images. All images will be processed using the same tiling setting. For most images, Tiling “2 x 2” or “4 x 4” produces the best results. A combination of “none” + “2 x 2” and “4 x 4” is advised as the default setting (see figure 1.1).
- Start processing. (Processing time is computer dependent. Computers with a powerful Graphics Card [Graphics Processing Unit] have much faster processing).

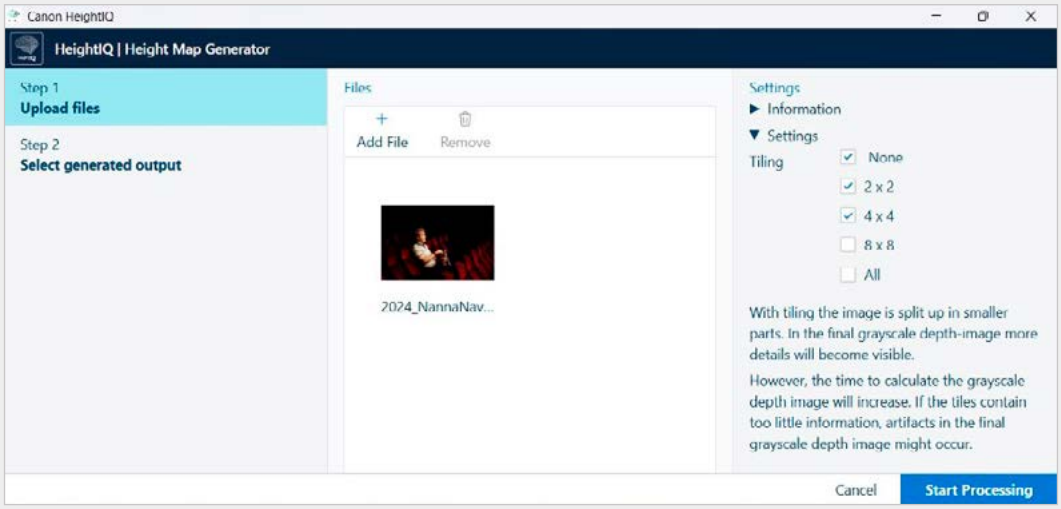


Figure 1.1 uploading input file(s) and tiling settings.

- Wait until all heightmaps are generated.
- Select the images that you want to save. It is recommended to select all images as the file sizes are small.
- Individual images can be saved while the others are still processing.
- Save a complete set by selecting “all” images from one source file while other source files are being processed.

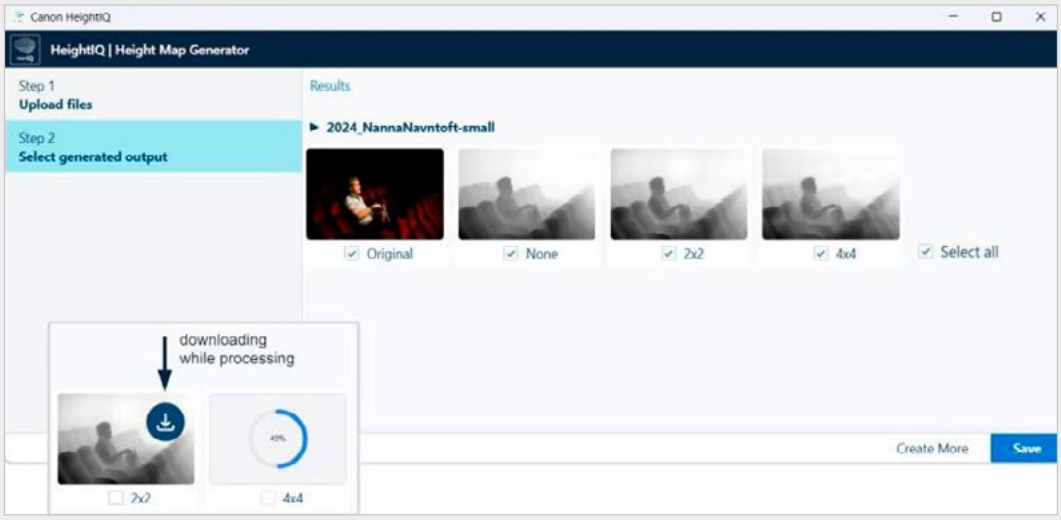


Figure 1.2 processing and saving the results.

By default, the files are saved in the “downloads” folder. When you select multiple files, the images will group in a .zip folder.

- Copy and move the downloaded .zip (or individual files) to the folder of your choice.

- Extract the .zip folder.

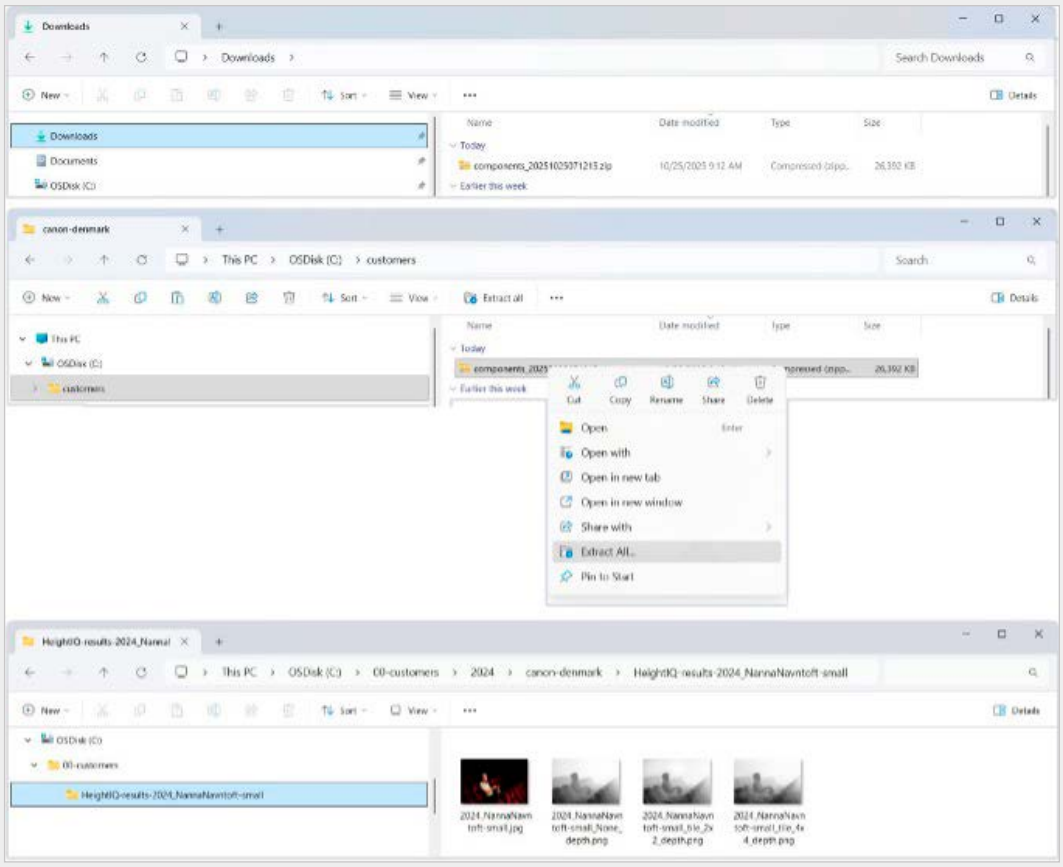


Figure 1.3 copy .zip file and extracting.

2 CREATING A PRISMAelevate XL PRINT-READY FILE FROM A HeightIQ HEIGHTMAP

This section explains how to use Adobe Photoshop[1] to create a PRISMAelevate XL print-ready file from a HeightIQ heightmap.

- Open the generated HeightIQ heightmaps including the color original.
- Determine which heightmap gives the best results; in this example the differences between Tiling “2 x 2” and “4 x 4” are limited.
- However, Tiling “4 x 4” shows some “ghosting”, therefore Tiling “2x2” will be used in the next steps (see figure 2.1).

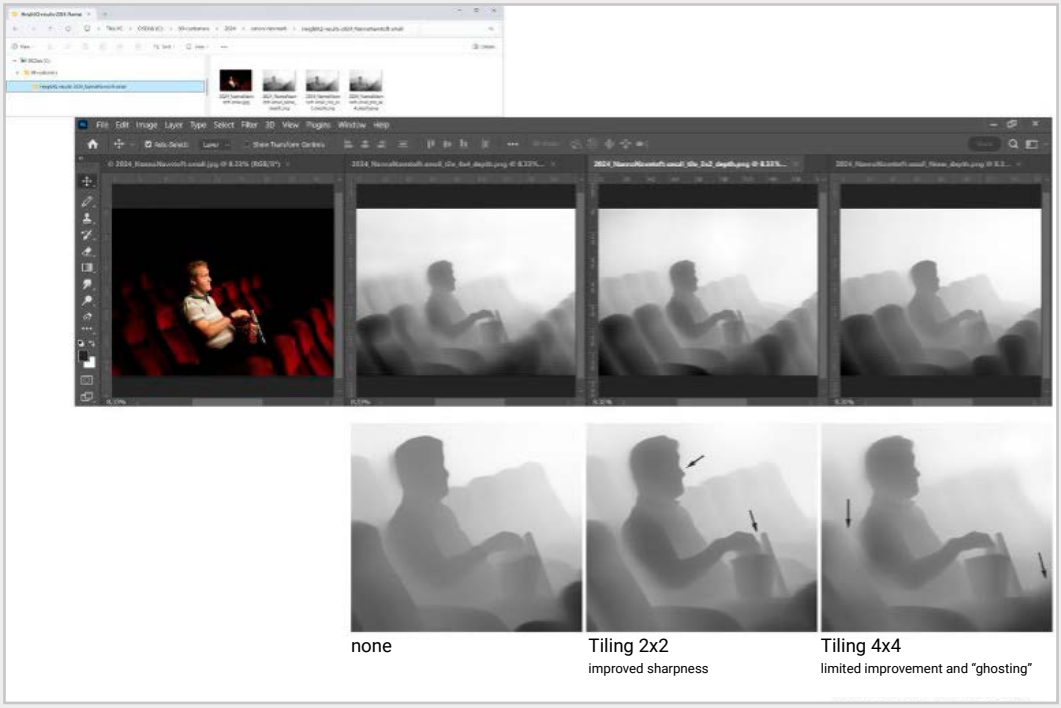


Figure 2.1 opening and selecting the best heightmap.

- Select the color file.
- Set to 16-bit color to obtain the best results.
- Select the Tiling “2 x 2” heightmap.
- Copy and paste in the color file.

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Create the PRISMAelevate XL layer structure as shown in figure 2.2.

- Group with original Tiling “2 x 2” heightmap.
- Duplicate this group to edit and optimize the heightmap without losing the original “2 x 2” heightmap.

Save the file as a .tif with lossless LZW compression to prevent large file sizes.

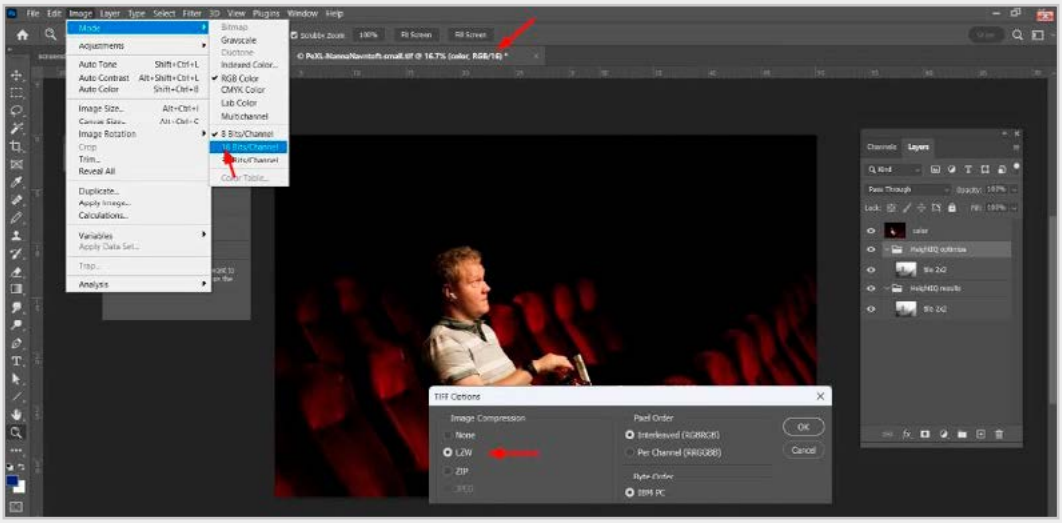

Figure 2.2 Creating the PRISMAelevate XL ready layer structure.

Expand the canvas (see figure 2.3). This helps you with the following steps to select parts of the image “beyond” the edges when using “feather values > 0” (see figure 2.4).

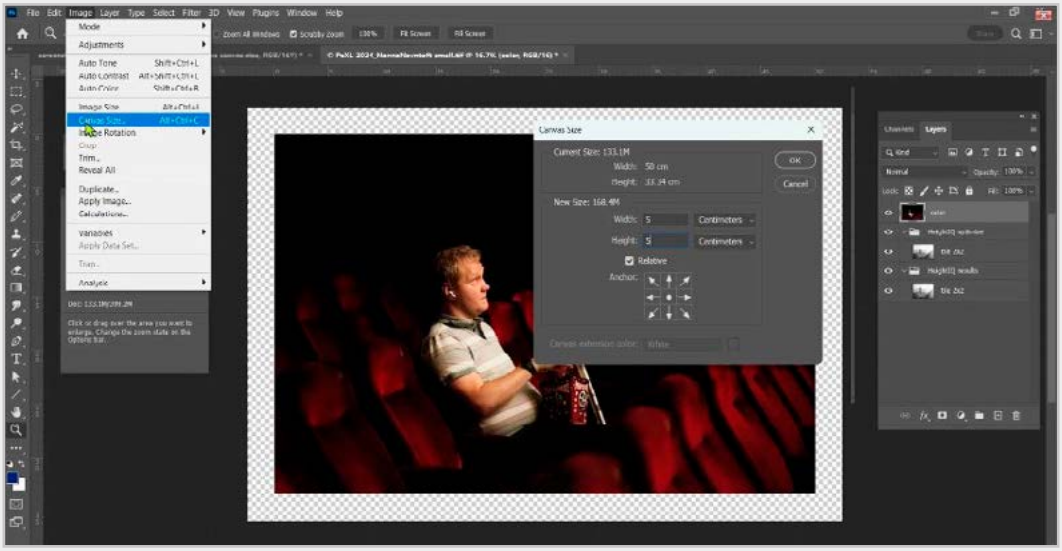

Figure 2.3 expanding the canvas.

- Figure 2.4 shows the heightmap as created with the HeightIQ tool. It gives a realistic estimation of the depth; however, in this example the person is the main subject that we would like to highlight.

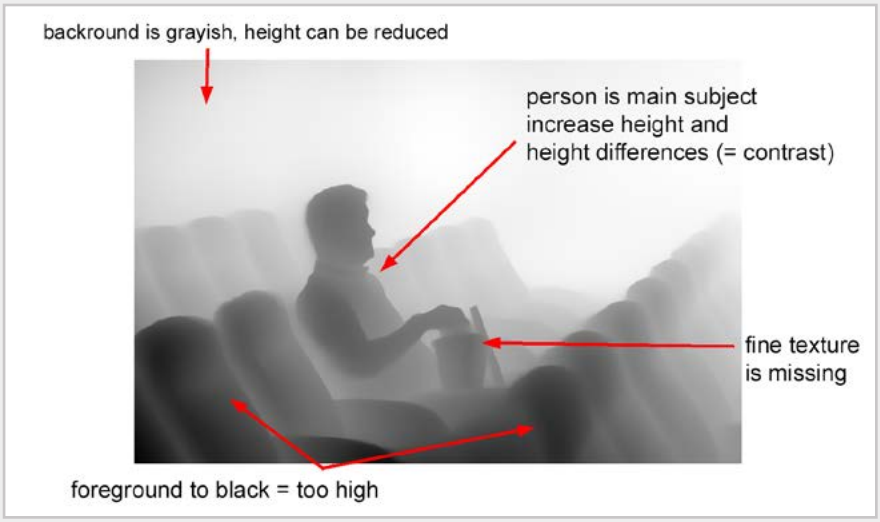

Figure 2.4

Lowering the foreground in the "HeightIQ optimize" layer (see figure 2.5)

- Lightening will lower the section of the image that you do not want elevated.
- Use the "lasso" tool to select the area that you want to lighten (lower), and select "Feather" 50-200 to smooth transitions between shapes.
- Use the "curves" tool to lighten the selected area. In this example, 100-80 is chosen. If you lighten too much, the transitions might become visible.
- If required, repeat this action with different selections a few times until you are happy with the result (see figure 2.6).

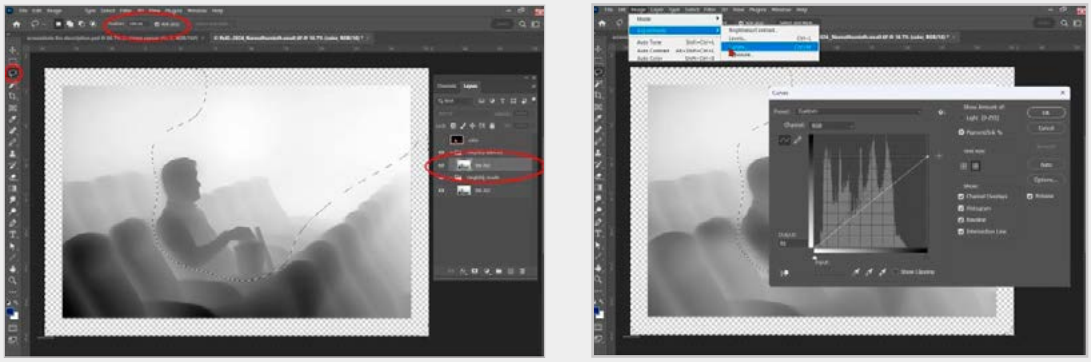

Figure 2.5 selecting areas that need to be lowered, use the "lasso" and "curves" tools.

- Make the person more elevated. This can be done in the same way as lowering the foreground. Though darkening will increase the elevation of the subject.
  - Select the person with the “lasso” tool.
  - Make this area darker with the “curves” tool (see figure 2.6a).

- The last step is increasing the height variation.
  - Select the whole image.
  - Use the “curves” tool to increase the contrast and fill the whole range from white to black (see figure 2.6b).

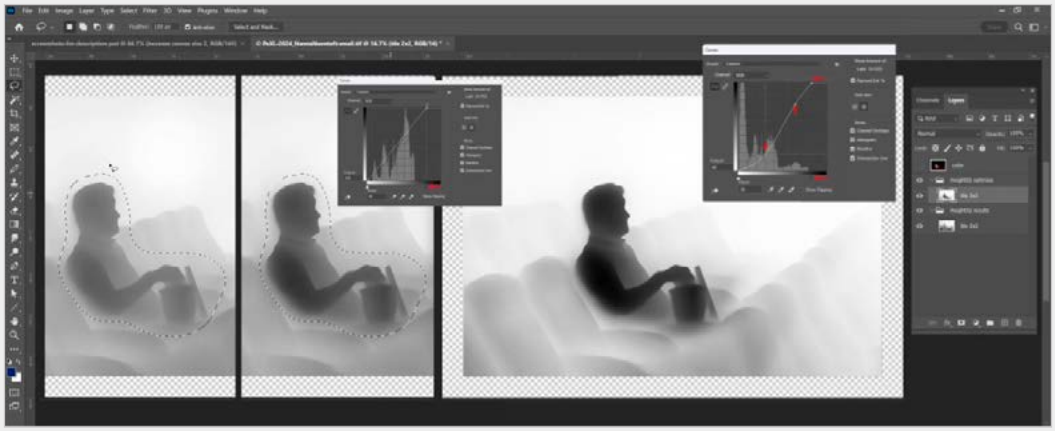

Figure 2.6a (left) increasing the 3D height of the person, figure 2.6b increasing height differences.

3 ADDING TEXTURE TO THE HEIGHTMAP

The HeightIQ tool makes an estimation of the depth in a picture, but it doesn't detect fine texture in an image. Therefore, a heightmap generated with the HeightIQ tool looks smooth. See figure 3.1. Textures can easily be added in Adobe Photoshop[1] using the information in the color image. This section shows how this can be done.

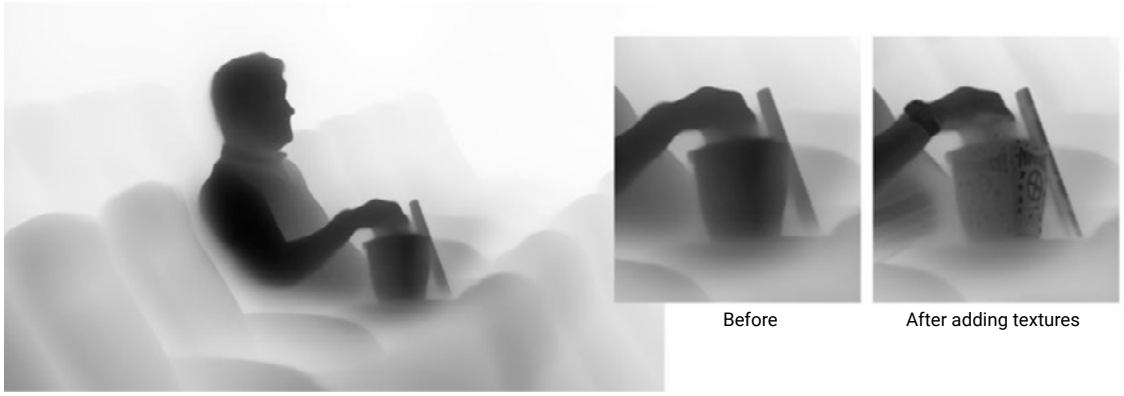

Figure 3.1 Optimized heightmap without textures (left), with and without textures (right).

Creating a black-and-white textures layer (figure 3.2)

- Duplicate the color layer.
- Move the color layer into the HeightIQ optimize group; keep this layer selected.
- Make the color layer invisible.
- Make black-and-white: image > adjustments > black-and-white. Click OK (note: it is possible to change the darkness of the individual colors to optimize the black-and-white appearance if needed).
- Invert: image > adjustments > invert.

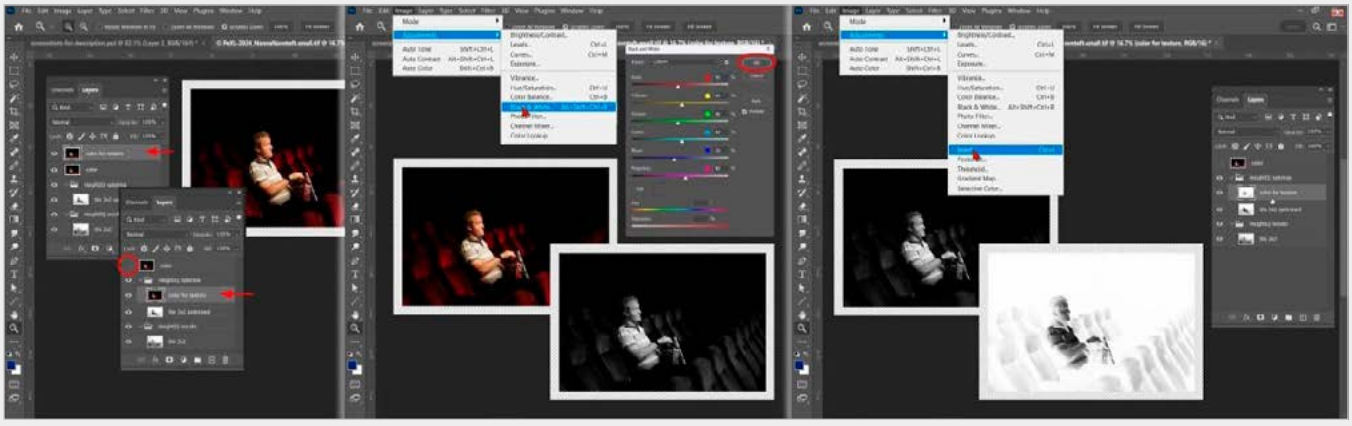

Figure 3.2 creating a black-and-white textures layer.

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Sometimes for the higher (dark) or lower (light) sections in the textures, images are not realistic. Although this is not critical, the textures layer will only contribute about 20% to the total height. In this example, the “watch” and “collar” were corrected (see figure 3.3).

Correcting details in the textures image layer

- Select and copy the part that must be optimized.
- Paste in place in a new layer.
- Invert (for this example).
- Select the corrected part, in this example the watch and collar, and delete the surroundings.
- When satisfied with the result, merge with the texture layer.

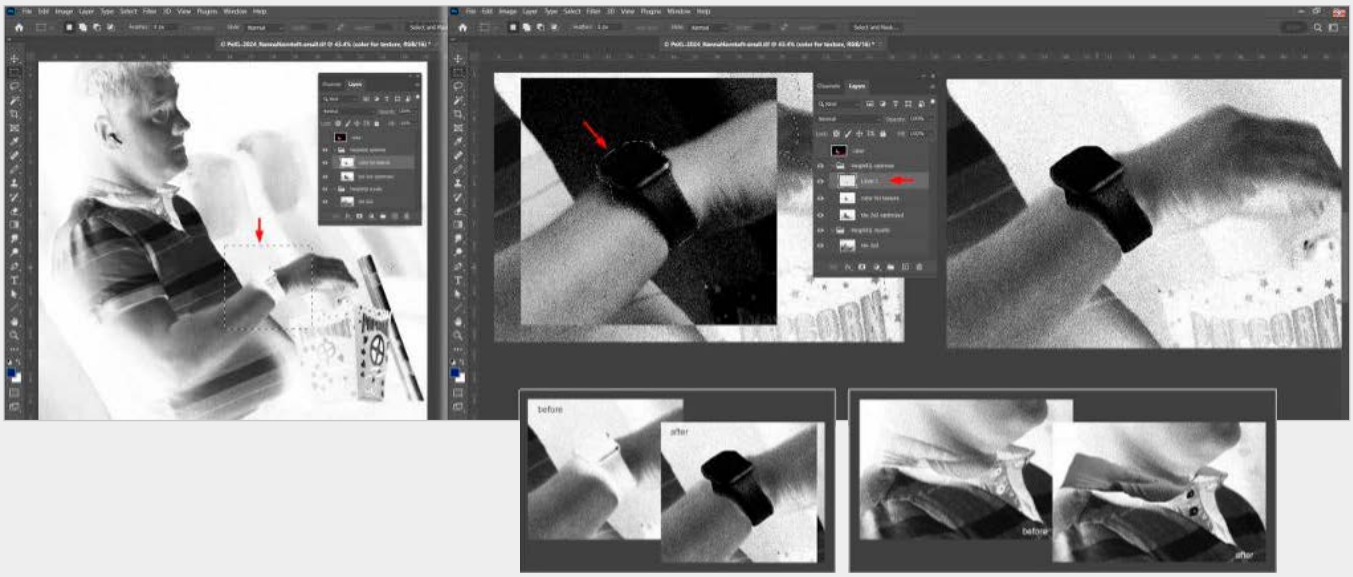


Figure 3.3 correcting details in the textures layer (watch and collar).

In nearly all color images some “grain” or “noise” is visible. When used as a texture image, this grain or noise will lead to “spikes or streaks” in the print and will deteriorate the color quality. Slightly blurring the texture image will limit this unwanted effect. Usually adjusting the pixel gaussian blur tool between 0.5-1.0 is sufficient. However, in this case, the grain is strong so a gaussian blur of 2.5 pixels was applied.

Blurring the texture image

- Select the textures layer.
- Select Filter > gaussian blur > 2.5 pixels (in this example).

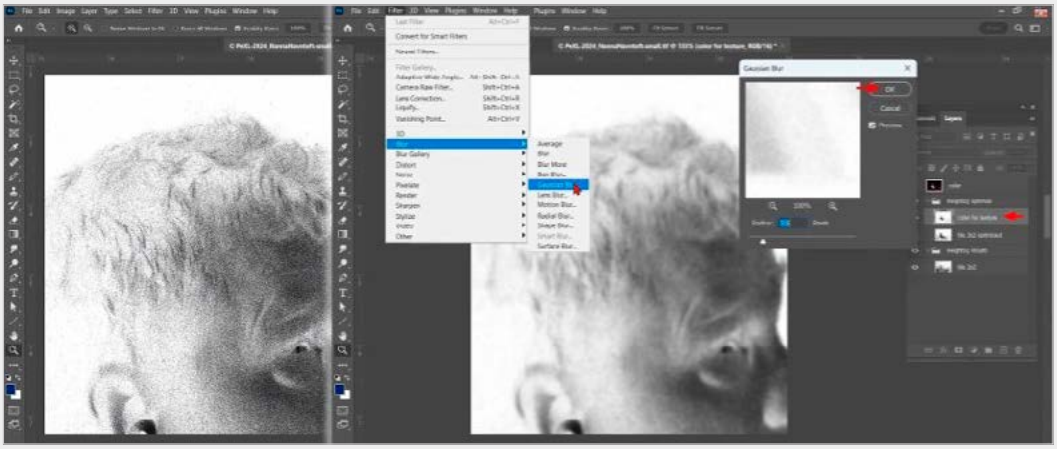


Figure 3.4 blurring textures image.

Now there are two layers with a heightmap: textures and HeightIQ tile “2 x 2” optimized. These layers must be combined. In general, a contribution of 15-30% of the textures layer and 70-85% of the HeightIQ layer achieves good results. Keep in mind, this depends on the image and the maximum height in the final print. You can see in the examples shown that 30% shows a better result at 1 mm, and 15% is the better result for printing up to 4 mm.

Setting the opacity and combining textures and HeightIQ heightmap. See figure 3.5.

- Duplicate the textures and HeightIQ heightmap.
- Check if the texture layer is above the HeightIQ layer.
- Select the textures layer.
- Set the opacity to a value between 15-30%.
- Select Merge Down.
- Rename the new layer. For example: final elevation, 83/17 max 3 mm.

An alternative to adding texture by adjusting the opacity is to use the “linear burn” tool option. In the example provided, this is accomplished by lowering the maximum density of the textures layer between 15-30% and the HeightIQ layer to 70-85% before merging the layers.

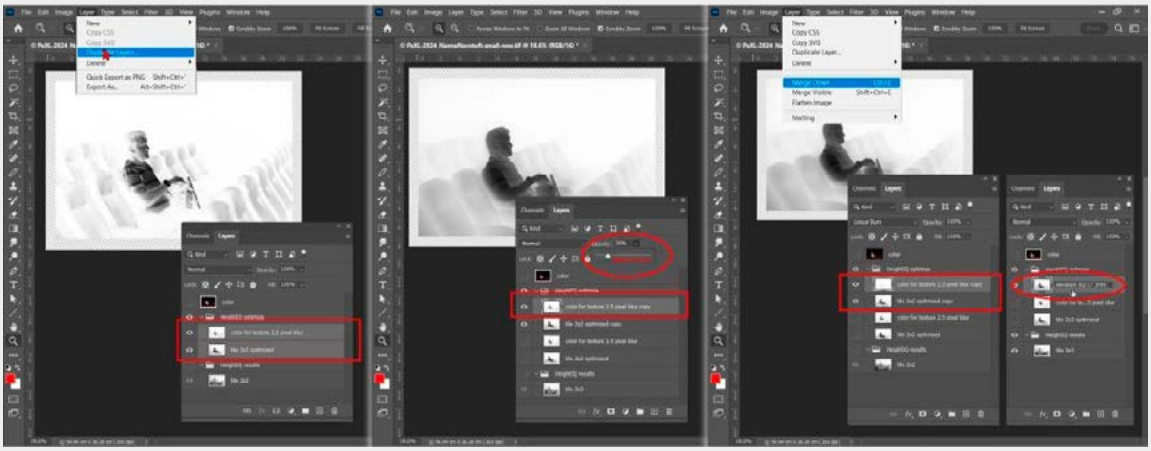
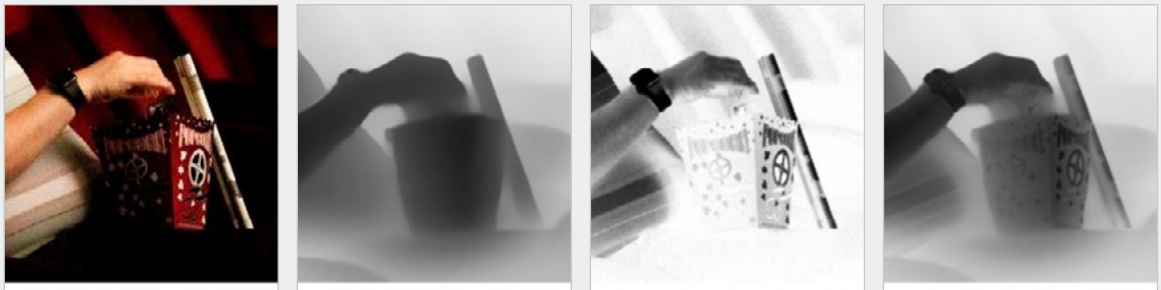


Figure 3.5 setting the opacity of the textures layer and merging with the HeightIQ layer.



Color image | HeightIQ Tiling 2x2, optimized | Textures image (based on color) | Combined final Heightmap (17/83)

Figure 3.6 results (detail).

Now the design is ready. In the last step, you can crop the image slightly to prevent any edge effects caused by the HeightIQ tool and/or image editing in Adobe Photoshop[1]. From here, you can preview the design in PRISMAelevate XL’s preview window before you commit to printing the application.

- Crop image (see figure 3.6).
- Select background in color layer with lasso tool (feather = 0).
- Select > modify > expand by 4 pixels.
- Select > inverse.
- Select > crop.

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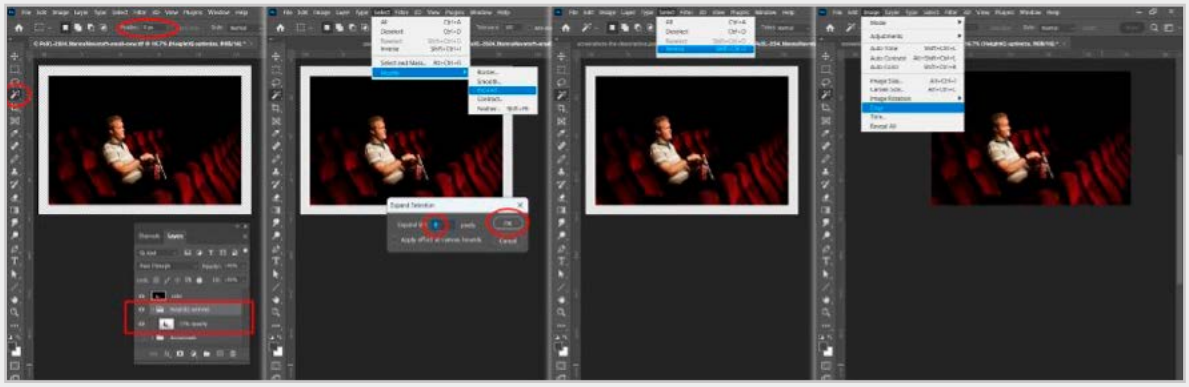


Figure 3.6 Crop image.

To obtain the maximum elevation height in the final print, the heightmap must contain (nearly) 100% black.

Adjusting maximum black

- Select the combined textures + HeightIQ heightmap.
- Select > image > adjustments > curve.
- Move the slider to the left until the blacks “clip”.

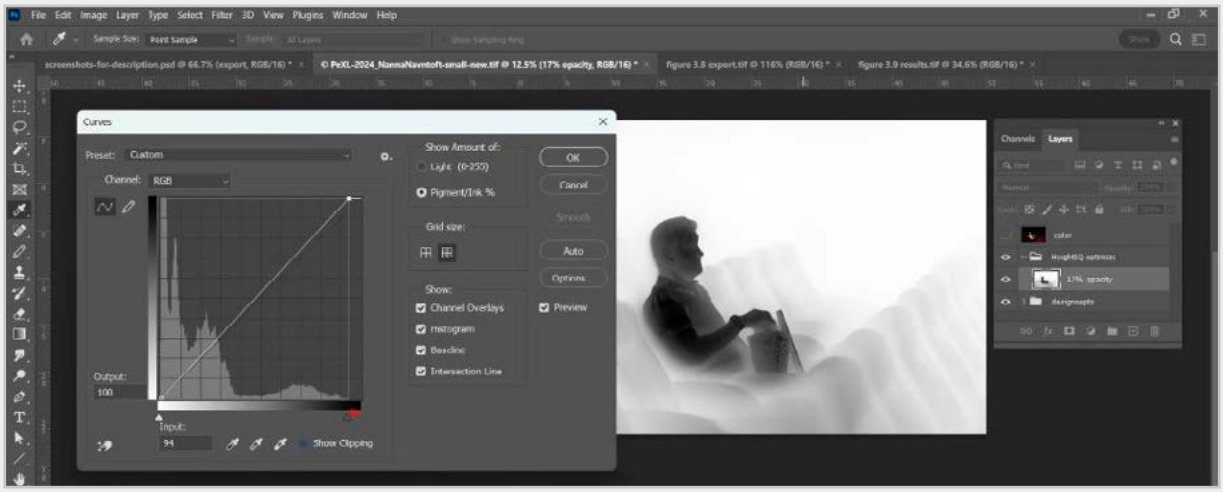


Figure 3.7 adjusting the maximum height up to 100%.

Preview in PRISMAelevate XL

- Select > Window > Extensions (legacy) > PRISMAelevate XL Preview.

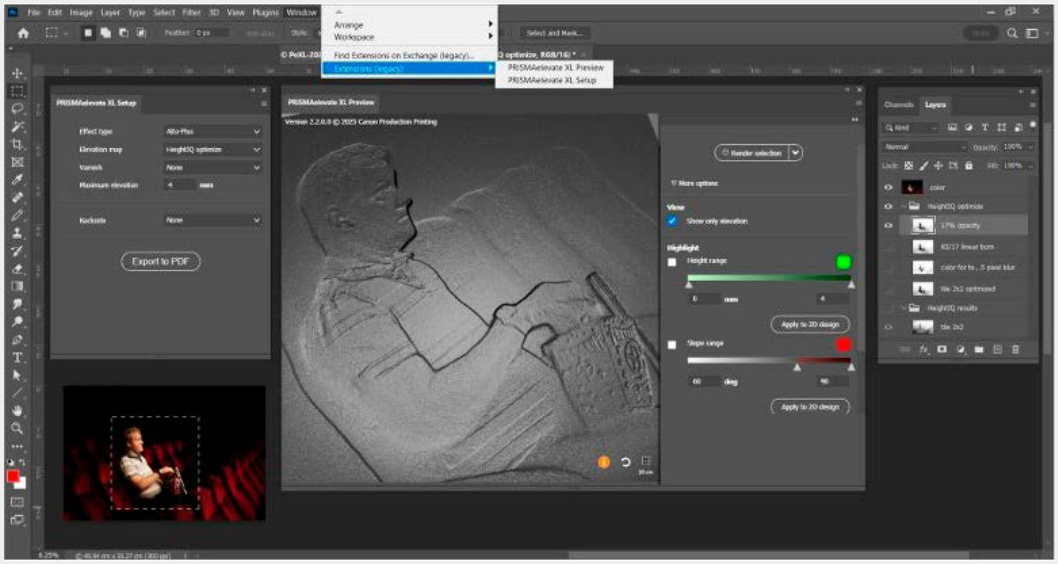


Figure 3.7 preview in PRISMAelevate XL preview.

Exporting to PRISMAelevate XL

- Export the design to a .pdf with PRISMAelevate XL setup.

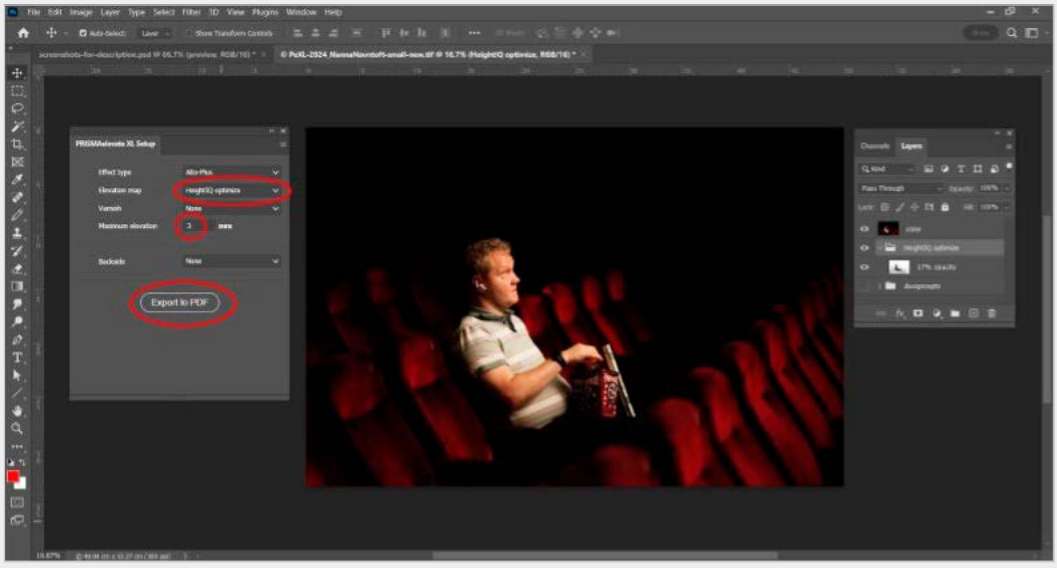
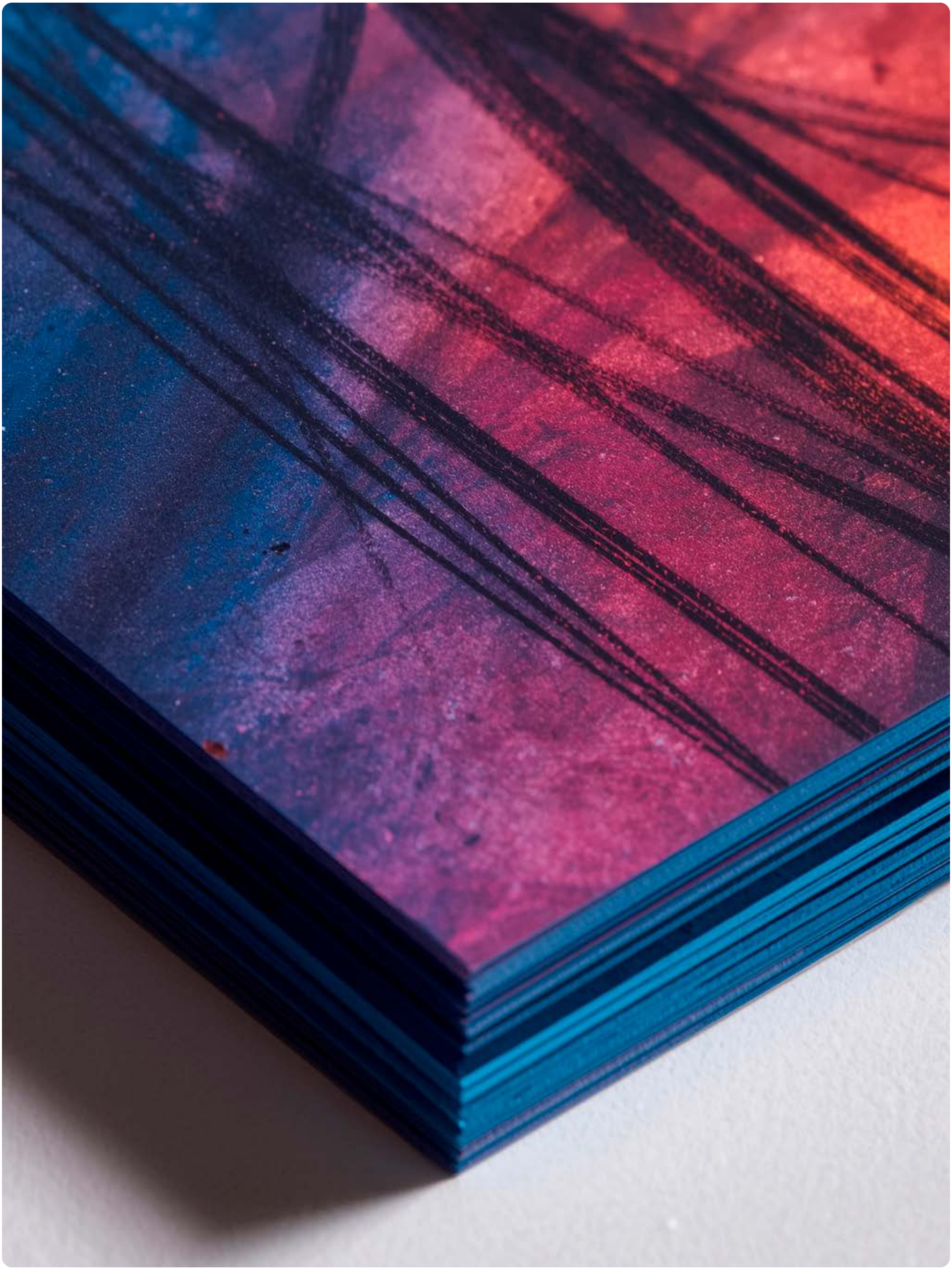


Figure 3.8 export with Canon PRISMAelevate XL setup.



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