Ghent Output Suite

Ghent PDF Workgroup

Patch 7.0, 7.1, and 7.2 — Output Intents

Intent

These patches are designed to clearly identify how applications and workflows handle the output intents of PDF/X files. These patches do not use spot colours.

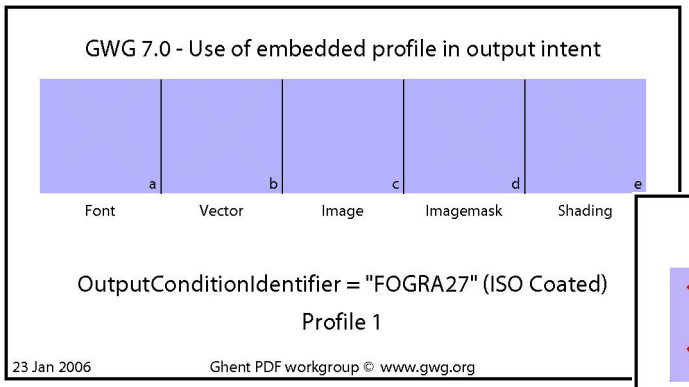
Testing guidelines

The files may be used in two ways:

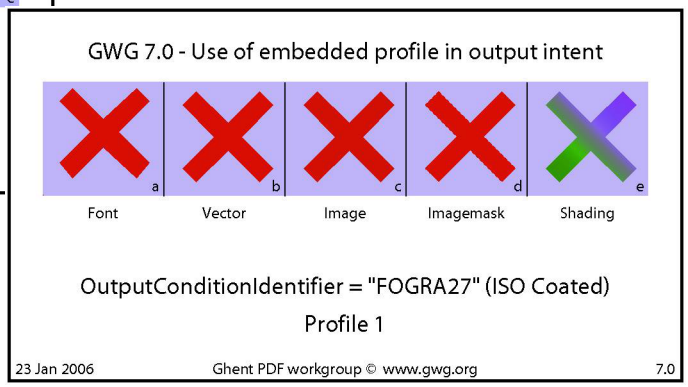
- A single file may be used to test a specific step in a workflow, such as a RIP.
- The files together may be used to test the whole of a workflow that will aggregate multiple files together, e.g. for partial page advertisements in a magazine.

Method of evaluation

Method 1
A clear X indicates the improper handling of a file



Correct rendering of the patch, all tests passed. No clear X is showing.



Incorrect rendering of the patch, all tests have failed. Each X indicates an incorrectly rendered test.

Description of tests

Every PDF/X file includes a structure called an "output intent" that describes the printing condition that it was prepared for. The concept of a printing condition includes aspects such as print technology (sheet-fed or web-fed offset, flexo, gravure, screen-printing, digital press, etc), as well as the substrate being printed on (paper type, etc), and the TVI, or dot gain, expected. "ISO coated" or "SWOP (CGATS TR 001)" are commonly used printing conditions.

Amongst other things, the output intent includes an unambiguously defined name for the printing condition, and may include an embedded ICC profile that describes how the job would print on a press matching the intended printing condition. The profile must be present in a PDF/X-3 file that includes any device independent colour data.

In a PDF/X-1a exchange the output intent is best used in pre-flight: to determine whether a file has been prepared for the printing condition that it will be printed under. If the output intent does not match the press setup, a print service provider or publisher might be expected to contact the supplier of the file to discuss the possibility that it may not print well. If an ICC profile is supplied it may also be used for proofing the file.

In a PDF/X-3 exchange the output intent may be used in pre-flight in the same way, but if the file contains any device independent colour data, the profile should be used in converting the colour into the CMYK colour space of the press. This is because the supplied profile includes instructions for the conversion of device independent colour to CMYK, as well as a description of the resulting CMYK itself. If a different profile is used for output then the tone-scale and gamut compression, black generation etc that were approved by the sender of the file in their own pre-transmission proof will be discarded.

In many cases the differences arising from use of the wrong profile will be subtle, and difficult to see. There may, however, be occasions where the file creator has explicitly set up a file to request specific processing, for example, a very long, or very short black (high GCR or low UCR) to change the appearance of a near-neutral or high-key image. In these cases it would be best to either honour the creator's wishes, or at least to discuss them before printing.

The three sample files presented here are all PDF/X-3 files containing device independent data (the five crosses on each patch). The embedded profiles are deliberately somewhat unusual to make it as easy as possible to determine whether they are being used or not. If any crosses appear obviously in the patches, or if the patches are printed or displayed in red then the workflow that you are using to aggregate and print them is not using the embedded profiles correctly.

The three test patches use different output intents:

7.0 – Marked as having been prepared for the standard printing condition for the rest of the Ghent output suite (FOGRA27, also known as ISO Coated)
7.1 – Marked as having been prepared for the "GWG Custom" printing condition.
7.2 – Marked as having been prepared for FOGRA27, but using a different profile in the output intent to that used in 7.0.

The patches are designed for use in a workflow test to ensure that the individual profile from each PDF/X-3 file is used in rendering that file. As a side-effect they also test that the correct rendering intent is used in each case.

A combination of 7.0 and 7.2 placed as if they were submissions from different sources (e.g. as partial page ads in a magazine workflow) will emulate what might be expected to become a very common situation. In such a workflow the differences between different embedded profiles for the same characterized printing condition might be expected to be relatively small (probably different black generation, or gamut compression). These test files emphasize the differences to make it easier to see whether the files have been processed correctly.

A combination of 7.1 with either 7.0 or 7.2 emulates another situation that may well become common; two files placed within the same print surface, even though they were originally prepared for different characterized printing conditions. There is no clear definition of correct behaviour in this case, although it's a reasonable assumption that most people would expect the embedded output intent profiles to be used.

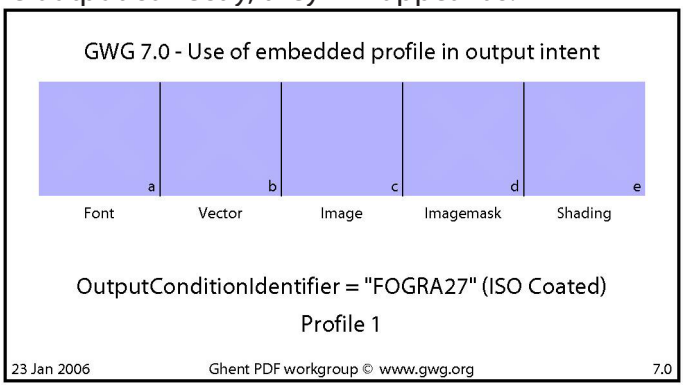
Each patch comprises five crosses, encoded as text, vector graphics, an image, an imagemask and smooth shading. The crosses are defined in a three-colour ICCBased colour space (tagged RGB), and are drawn on top of a rectangle defined in CMYK. All of the crosses should be rendered using the Perceptual rendering intent.

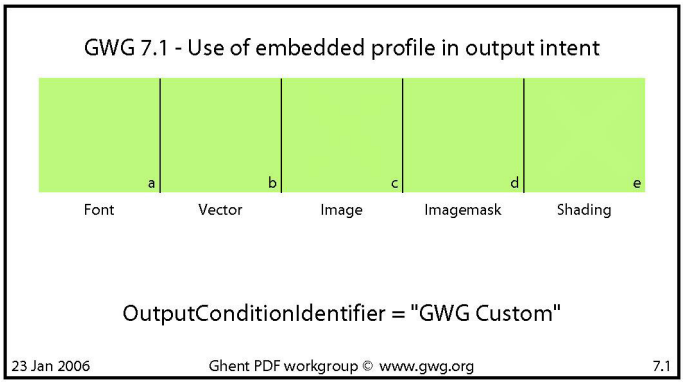
In all cases the ICC profiles embedded in the output intents are deliberately very unusual:

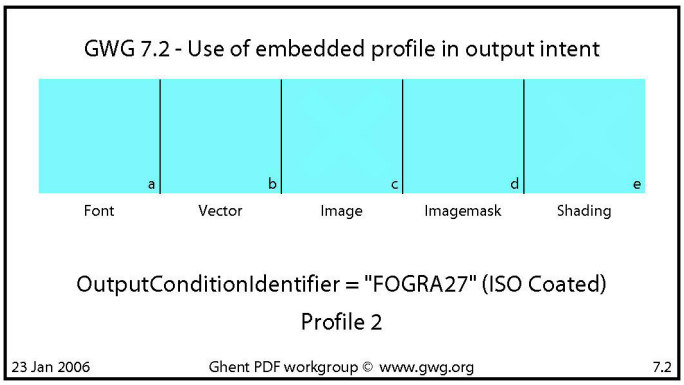
- PCS to device, Colorimetric rendering intent, will convert the colour of all device independent objects to Magenta. Saturation rendering intent will convert them to Yellow. Perceptual will convert to different colours in the three files, to match the colour of the background rectangle.

- The Perceptual and Saturation Device to PCS tags will convert objects to display in red; these would not be used in a normal workflow. Colorimetric Device to PCS tags will provide a transform very similar to that of ISO Coated (FOGRA27), as those would be used in a proofing system to support emulation.

When the files are output correctly, they will appear as:







To read the patches:

- If the background rectangle and the crosses are in red, then the workflow has used the Perceptual or Saturation Device to PCS tags within the embedded ICC profile. This is occasionally done in rather simplistic colour managed displays, and is an incorrect output.

- If one or more crosses are clearly visible against a background that is not red, then the embedded ICC profile has not be used at all. This is an incorrect output.

- If one or more crosses are visible as Magenta or Yellow the embedded ICC profile has been used, but the rendering has been performed using the wrong rendering intent. This is an incorrect output.

- If none of the crosses can be seen, the output is correct.

- If one or more crosses are discernable in a colour similar to that of the background rectangle the colour management engine in use has applied the embedded ICC profile and used the correct rendering intent. The CMM in use, however, produces results slightly different from those in the reference implementations. The more clear the crosses are, the more of a problem this shows; a faintly visible cross should not normally be treated as a sign that the workflow is incorrect.

Notes

The files are not suitable for use in building a pre-constructed test page, because in doing so the output intent in each file must either be lost, applied (e.g. by conversion of the whole patch to CMYK), or will affect all other patches from which the test page is built. The files can however be amalgamated together in order to test the amalgamating software.

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