PDF association

Application Note

PDF 2.0 Application Note 001: Black Point Compensation

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PDF TWG

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Preface

This Application Note was produced by the PDF Association's PDF Technical Working Group (TWG) to explain the use of the **UseBlackPtComp** flag, a new feature in PDF 2.0.

It provides interpretation of the existing specifications; it does not change the text of those specifications.

The principal authors of this document are Martin Bailey (Global Graphics) and Peter Wyatt (consultant, ISO 32000 co Project Leader).

References

ISO 32000-2: 2017, Document management -- Portable document format -- Part 2: PDF 2.0 (PDF 2.0), https://www.iso.org/standard/63534.html

ISO 18619:2015 (Image technology colour management -- Black point compensation), https://www.iso.org/standard/63033.html

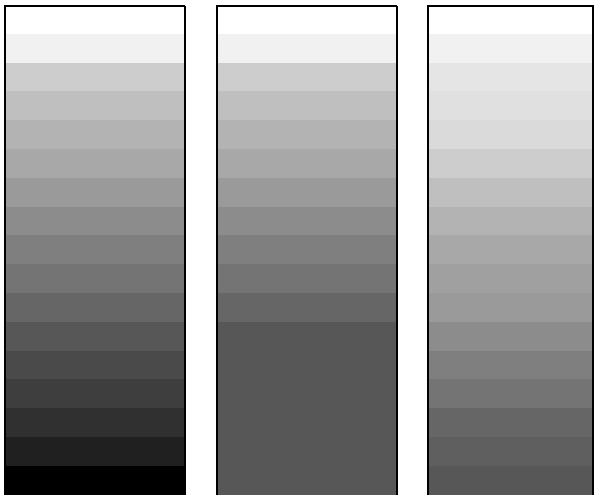
What is Black Point Compensation?

General

Black point compensation (BPC) is a technique used in colour management. It adjusts the colour transformation that will be applied, especially towards the shadow end of the tone scale, by aligning the darkest colour that could be described by the colour space of the data to be displayed with the darkest colour that the output profile for the display device (screen or print) can produce.

It's therefore very similar to what switching between absolute and relative colorimetric rendering intents does at the highlight end of the tone scale. That aligns the lightest colour in the colour space in the PDF file to the lightest colour that the output device can produce, on a printing device that usually means the underlying substrate.

Black point compensation as used in PDF is formally defined in ISO 18619:2015.



RGB source: Continuous tone to black

No BPC: Tonal progression truncated

BPC: Darkest tone remapped; better tonal progression

Circumstances and use cases

Black point compensation is already widely used in production printing, especially in situations where the combination of the substrate, colourants (e.g. inks) and printing process cannot achieve a very high density for blacks.

As of this writing it is typical to turn BPC on or off for the whole job.

What does the new flag do?

The new **UseBlackPtComp** key in a graphics state parameter dictionary allows BPC to be turned on or off for different graphics objects in a PDF.

The key can take three states: *ON*, *OFF* and *Default* (note that these must be exactly as shown here). The default value is *Default*, which means that whether BPC should be turned on or off is up to the PDF processor.

Why might you want to use it?

Turning on BPC will often increase the perceived quality of graphical elements such as natural photographic images because they may achieve a higher contrast and more 'punch'.

But if turned on for the whole of a print job it may also be applied to graphical elements in colours that should be reproduced as accurately as possible, such as brand colours. Whether brand colours will be affected by BPC depends on:

- How those brand colours are specified in the PDF file using process colours or spot separations, and

- The configuration of the workflow used to prepare, colour manage and render the file.

Applying BPC to sensitive colours such as brand colours risks reproducing them incorrectly.

The **UseBlackPtComp** entry in a graphics state parameter dictionary may therefore be used to enable BPC for those elements that would benefit from black point compensation, such as natural images, while preventing BPC from being applied to sensitive colours.

What risks are associated with using UseBlackPtComp?

Some PDF workflows that were designed to accept PDF 1.7 files will accept many PDF 2.0 files without triggering any errors. If a file using **UseBlackPtComp** is submitted through a PDF 1.7 workflow then the flag will be ignored. This is by design to ensure backwards compatibility of PDF 2.0 with PDF 1.7. However, this can cause a difference in the visual appearance of output produced with a PDF 1.7 workflow vs. a PDF 2.0 workflow.