PDF 2.0 Updates: Rendering and Color Processing

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Rendering and Color Processing Updates

Important Additions

- Black Point Compensation (BPC)
- Annotation transparency

Important Changes

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- Inline images
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- Halftones

Important Deprecations

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Important Additions

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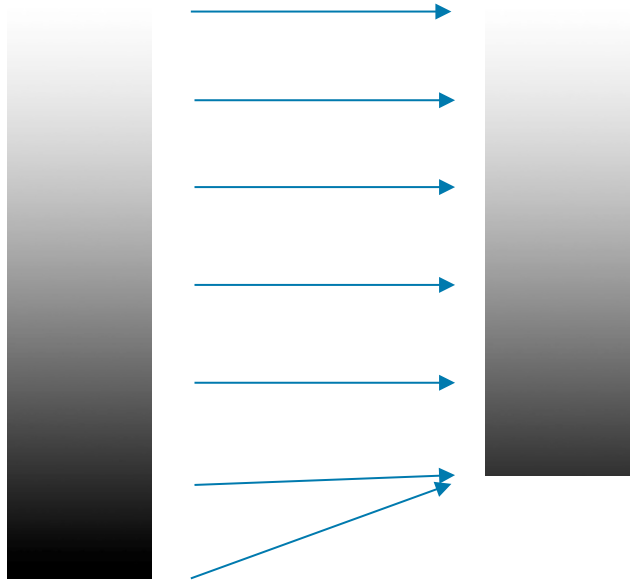
2018-05-14

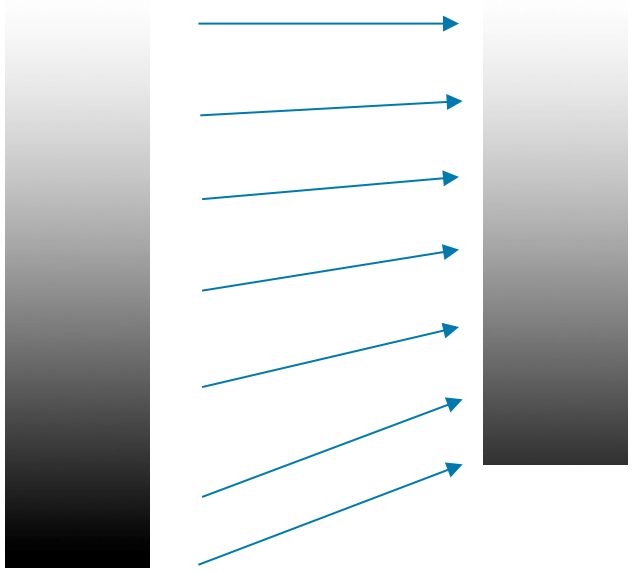
Black Point Compensation

Black Point Compensation (BPC) compensates for differences in achievable black intensity when converting colors

Without BPC



With BPC



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Black Point Compensation

Added to graphic state parameter (ExtGState) dictionary

- Allowable values: ON, OFF, Default
- ON: color conversion shall use black point compensation (as defined in ISO 18619)
- OFF: no black point compensation is permitted
- Default / unspecified: processor may do as desired
- When render intent is absolute colorimetric, black point compensation is always off

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Transparency for Annotations

Annotations may now specify opacity and blend mode:

- In their appearance streams
- In annotation dictionary, to be used for regenerating appearance streams

Annotation content streams are now involved in determining if a page uses transparency

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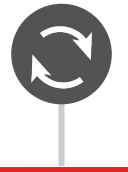
Transparency Changes: Better Guidance



Several areas where transparency handling was ambiguous in PDF 1.7 have been clarified

- Better guidance on when objects involved in transparency need to be converted to a blending color space (11.7.2)
- Guidance on determining actual blending color space of a transparency group (Annex P)
- Clarification on how special "All" separation color is handled inside transparency groups (11.7.3)
- Rules for determining if a page has elements involved in a transparency operation (Annex Q)

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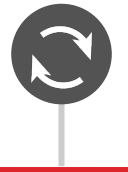
Transparency Changes: Blending Modes



Correction to ColorBurn and ColorDodge blending mode formulas:

- **ColorBurn: correct case where source color value = 0 & background color value = 1 (result now 0 instead of 1) to make continuous function**
- **ColorDodge: correct case where source color value = 0 & background color value = 1 (result now 1 instead of 0) to make continuous function**

Corrections bring these formulas in alignment with common existing implementations of PDF transparency

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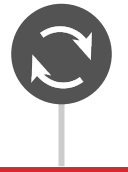
Rendering Changes



PDF rendering sections were cleaned up and clarified:

- **Removed some requirements in color conversion process to device color spaces**
- **Added flexibility for rendering and color conversion to better meet proofing and output simulation devices**
- **Requires use of ICC standard for color conversion (ISO 15076-1:2010) for CIE-based source and destination color spaces**
- **New section (10.8) on rendering for separations provides guidance for separations simulation in process color workflows**

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Inline Images

Inline images now require length to be specified

- New L key denotes length of inline image data stream (after filters are applied)
- No longer inferring inline image end of data
- Maximum length of 4,096 bytes recommended in specification

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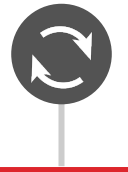
Output Intent Changes



Output intents gain several new capabilities:

- **Output intents may now be specified per-page or document-wide**
- **Ability to reference external ICC profiles by filename or URL**
  - URL referenced profiles are not bound by restrictions on embedded profiles, to allow N-component ICC output profile references
- **Spectral data information added to allow characterizing spot colors in CxF/X-4 (ISO 17972-4) format**
- **Mixing hints added to output intents to allow characterizing DeviceN ink interactivity**

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Output Intents: A Note on Usage

Output intents are intended for use with PDF/A, PDF/X, PDF/VT and PDF/E files

In theory: no impact on rendering or printing until these standards are updated to use PDF 2.0

In real life: some workflows already use output intents more generally, this is neither prohibited nor encouraged by PDF 2.0

- **Do be aware, however, that the usage of output intents may be unpredictable - when and which to use for general PDF is intentionally outside the scope of the standard**

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Halftoning Changes

New annex provides best practices and advice for halftones (Annex N)

- Including how to match halftone behavior of 32000-1

Halftone origin (HTO) can be set in graphic state dictionary

- Reduces mis-alignment of halftones across multiple rendered pieces

Dot shape may now be specified with names not defined in PDF

- Device-specific, device to use the first name it understands

Removed requirement to use default halftone algorithm in transparency compositing

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⚠ Important Deprecations

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2018-05-14

Important Deprecations

Significant deprecations in PDF 2.0 for rendering and printing

Separation dictionaries (14.11.4)

Trapping support and trap networks (14.11.6)

OPI image references (14.11.7)

Viewer preferences deprecations

- ViewArea
- ViewClip
- PrintArea
- PrintClip

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Important Deprecations

Significant deprecations of degenerate cases

Standard 14 fonts now required to have font descriptors

Annotations are now required to have normal appearance streams

Use of F path operator deprecated

- Use equivalent F path operator instead

Transfer functions are deprecated in graphic states

- If needed, these should be set in a halftone dictionary (see 10.5)

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Summary

PDF 2.0 contains important additions and updates for more reliable rendering, color processing and printing

PDF 2.0 changes affect both PDF products and PDF consumers

Most changes are backwards-compatible and will not significantly impact PDF viewers or processors that handle PDF 1.7

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Thank you! Any questions?

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