PDF association

Application Note

FAQ on HDR in PDF: Focus on PDF/A and PDF/X

Version: v1.0
2025-07

PDF Imaging Model TWG

PDF Association
Friedenstr. 2A · 16321 Bernau bei Berlin · Germany

E-mail: copyright@pdfa.org
Web: pdfa.org
Published in Germany and the United States of America

Table of Contents

Introduction 1

Terms and definitions 1

FAQ 1

Helpful resources 3

Introduction

Many modern imaging devices can capture or display high dynamic range (HDR) content. As a result, HDR images and color data can now be included in PDF files, including the ISO-standardized subsets for archival and production-print applications, PDF/A and PDF/X, respectively.

To ensure a consistent visual experience, the PDF/A (ISO 19005) and PDF/X (ISO 15930) series of standards both define a "conforming processor" – software that follows the respective standards' rules for displaying PDF files. While HDR technology continues to evolve, it is important to understand the acceptable uses of HDR images and color data in terms of existing PDF/A and PDF/X standards.

Terms and definitions

HDR	High Dynamic Range
ICC.1	The International Color Consortium's color profile format (ISO 15076-1) used by PDF's ICCBased color space. ICC.1 v4.4 color profiles can include HDR information.
JPEG 1	JPEG 1 (ISO/IEC 10918-1) is a common bitmap (raster) color image format supported in PDF via the DCTDecode filter. JPEG 1 images can include various HDR tags and information.
JPEG 2000	JPEG 2000 (ISO/IEC 15444) is an advanced bitmap (raster) color image format supported in PDF via the JPXDecode filter. JPEG 2000 images can include HDR information.
PDF/A	An ISO-standardized subset of PDF for long-term archiving, defined by the ISO 19005 series of standards. This includes PDF/A-1, PDF/A-2, PDF/A-3, and PDF/A-4.
PDF/X	An ISO-standardized subset of PDF supporting blind exchange in the graphic arts, defined by the ISO 15930 series of standards. This includes all PDF/X parts and conformance levels up to and including PDF/X-6.
SDR	Standard Dynamic Range

FAQ

Is it valid for JPEG 1, JPEG 2000, or ICC.1 color profiles with HDR data to be present in PDF/A or PDF/X files?

Yes – however, the HDR data in such images and profiles is considered private, and is therefore ignored by viewing software that conforms to the respective standard (a.k.a. "conforming processors"). See our publication "Understanding Private Data in PDF/A".

Will PDF/A or PDF/X files that include HDR data display as HDR by "conforming processor" software?

No. The underlying core PDF specifications do not define rules for rendering HDR data. Therefore, all current-generation PDF/A and PDF/X standards likewise do not address HDR data. Accordingly, PDF/A and PDF/X conforming processors are obliged to ignore HDR data.

My PDF/A or PDF/X file displays as HDR – what does that mean?

HDR rendering of current-generation PDF/A or PDF/X files means that your PDF software is not currently functioning as a PDF/A or PDF/X conforming processor. Activate this feature in order to get a rendering that conforms to the respective standard. If the ability to turn off the HDR rendering is not available, check with your PDF software vendor.

As of early 2025, any display of HDR data is implementation-dependent and not portable.

Can a PDF/A or PDF/X conforming processor work on an HDR display?

Yes – HDR-capable systems include full SDR support. However, the operating system, display driver, and/or PDF software can all influence on-screen appearance, so it may be necessary to check with vendors for specific details.

Will PDF/A or PDF/X validators fail files that include HDR data?

No. As mentioned above and described in Understanding Private Data in PDF/A, it is acceptable for PDF/A and PDF/X files to include private data such as HDR data. However, these standards prohibit using private data for rendering when the viewing software is operating as a PDF/A or PDF/X conforming processor.

Can ICC profiles used by OutputIntents include HDR information?

Yes, but the HDR information must not be used by PDF/A or PDF/X conforming software. PDF/A and PDF/X utilize output intents (ISO 32000-2:2020, clause 14.11.5) to ensure reliable appearance by providing a means for matching the colour characteristics of page content in a PDF document with those of a target output device. Using HDR data in PDF OutputIntents will result in an implementation-dependent appearance.

How can I know if my PDF includes HDR data?

Software can thoroughly analyze files and report the presence of any HDR information – check your documentation or with the vendor to determine whether your software supports the detection and reporting of HDR data. Such checks require a detailed analysis of all image and color data and may be quite slow. Additionally, as specifications for HDR are still emerging, the reliability of these reports will depend on each implementation – please consult your vendor for more information.

If I extract images that include HDR information from PDF files, is the HDR data retained?

This depends entirely on the software used and whether the extracted images are transcoded upon extraction. Please check your software documentation or with your PDF software vendor.

Can I use JPEG XL images in PDF files?

Not directly. To conform to current PDF, PDF/A, and PDF/X requirements, JPEG XL images need to be converted to existing PDF image formats (such as JPEG 1, which is compatible with the DCTDecode filter).

Does PDF support HDR content?

Not today. PDF allows HDR information to be present as private data in JPEG 1 images, JPEG 2000 images, ICC.1 v4.4 color profiles, or in other ways. However, today's PDF specifications and standards don't define interoperable (portable) HDR rendering. Any current HDR rendering of PDF content is entirely implementation-dependent; such renderings may not match future specifications.

Will PDF support HDR in the future?

Yes. Through the PDF Association's Imaging Model Technical Working Group, industry stakeholders are actively developing new PDF specifications for interoperable (portable) HDR rendering and related capabilities (including adding support for additional image formats, such as JPEG XL). However, as of early 2025, any HDR rendering of PDF content is entirely implementation-dependent, not portable, and may not conform to the final specifications and standards.

Will PDF/A and PDF/X support HDR in the future?

Once HDR support is specified for core PDF, next-generation PDF/A and PDF/X standards may be needed to support the interoperable use of HDR data in long-term preservation and graphic arts applications.

Helpful resources

PDF/A information https://pdfa.org/archival-pdf/

PDF/X information https://pdfa.org/resource/iso-15930-pdfx/

Imaging Model TWG https://pdfa.org/community/imaging-model-twg/

PDF/A TWG "Understanding Private Data in PDF/A"