Automation Engine 22

PDF Formats and their Metadata

ESKO✳

Contents

1. Normalized PDF and XMP in Automation Engine

1.1. Introduction

Naming Convention

In this section, PDF files that have not gone through normalization will be referred to as "**PDF**".

PDF files that have been normalized will be referred to as "**Normalized PDF**".

Normalization in Automation Engine, your choice...

- **In Automation Engine 16 till 18.1 – Before PDF+**

  There are 2 types of technologies handling graphic files:

  - **PDF tasks**: These tasks process PDFs without prior normalization.

  - **Normalized PDF tasks**: These tasks require a PDF to be normalized before they process it.

  These 2 types of tasks can be mixed in a workflow:

  - PDF tasks can process Normalized PDFs.
  - Normalized PDF tasks will automatically normalize regular PDFs.

- **Since Automation Engine 18.1.1 – Since PDF+**

  Automation Engine 18.1.1 (Nov 2019) introduced the first tasks handling PDF+ files from ArtPro+.

  This added a 3rd type of PDF task technology, but it is the one that eventually will replace Esko's PDF Normalization.

  Learn all about PDF+ and this native PDF workflow in *PDF+ in Automation Engine* on page 11.

1.2. What Makes a Normalized PDF Special?

Overview

Normalized PDF files are to a large extent regular PDF 1.6 files, except in these specific areas:

- External references
- Color space
- Document level metadata
- Object level metadata

External references

A Normalized PDF is not always self-contained. It can refer to images or other PDFs that are not embedded in the PDF itself. Making use of references instead of embedding images and/or graphics can have several advantages in the workflow.

- The main advantage is that it allows for "**late binding**".

  For example: An image can be color corrected. After the color correction all PDFs that refer to this image will automatically contain the corrected version of the image without the need to open and rewrite these PDFs.

- Working with Normalized PDFs that have external references can also lead to **faster processing**, especially when the Normalized PDF refers to large amounts of external image data.

> **Attention:** Although referring to external files is a standard PDF feature (for example used in the PDF/X-5), most PDF applications do not support this. To guarantee that a PDF can be processed correctly by a PDF application (like Adobe Acrobat), it has to be made self-contained (embedding all the referred components like images). A self-contained Normalized PDF is 100% PDF compatible.

Color space

A Normalized PDF can only contain objects in the final printing color space. This final printing color space can have any number of separations but in most cases this will be CMYK and some spot colors. The PDF object model allows objects to be defined in RGB and CIE based color spaces. This is not possible in Normalized PDF. During normalization such objects are color converted to CMYK.

The fact that Normalized PDF cannot contain objects in RGB or CIE based color spaces is its biggest limitation. On the positive side, it makes the workflow more predictable. It avoids late and often somewhat hidden color conversions (for example in the RIP) that can lead to problems in printing.

Document level metadata

A Normalized PDF contains XMP metadata. The schema of the XMP data is Esko specific, but the specification is public. The XMP metadata serves 2 purposes. It contains info about the file that can be extracted by 3th party applications and used for example for quality control or asset management. The XMP metadata are also used by Esko applications like Automation Engine to retrieve information from a PDF in an efficient way (for example the number of separations).

Object level metadata

A Normalized PDF contains metadata for specific objects like barcodes. Object level metadata are added to allow modification of those objects using an Esko application. Object level metadata are stored using a proprietary mechanism and format.

1.3. Which Tasks Require PDF Normalization?

The Esko normalization technology is related to a graphics software kernel from Esko named '**Brix**'. This is the kernel that is also used in products like PackEdge and Plato.

Historically, 2 other graphics kernels entered Esko's product offering: the one using the **ArtPro** native file format and the **Enfocus** PDF library.

The *second part of this chapter* explains the most recent graphics kernel: the PDF+ native one as used in **ArtPro+**. Eventually, this one is to replace the 3 mentioned above, which is why we also name those 3 the 'classic' ones.

This sections contains *a page that lists all task types and the graphics technology they use*. This includes all task types that rely on Normalization. i,e. that use the Brix technology.

Note: Mind that the types of tasks available on your Automation Engine server depends on the licenses you have ; so some tasks in the list below may not be visible in your client application.

1.4. How do PDF native tasks Work with Normalized PDF Files?

Important: The PDF tasks require self-contained input files and will therefore automatically embed all external references that a Normalized PDF file may have.

An example:

Below example workflow takes a file, removes the separation named "Cut" and then traps the file. This workflow can be used with both Normalized and native PDF documents.


We here describe how Automation Engine processes a Normalized PDF input file in this workflow:

| Task	Task Type	Description
Optimize PDF Separations (Classic)	PDF task (Enfocus PDF technology)	The task checks whether the Normalized PDF input file contains any external references to images or other Normalized PDFs: • If there are **external references**, the "Optimize PDF Separations" task will first make the Normalized PDF input file **self-contained** (by embedding all the external references). • If there are **no external references**, the task will process the Normalized PDF directly. The task also updates the XMP document metadata.
Trap with PowerTrapper (Classic)	Esko Normalized PDF task	The task traps the Normalized PDF file.

1.5. How do Normalized PDF Tasks handle native PDF Files?

We again use this example workflow:
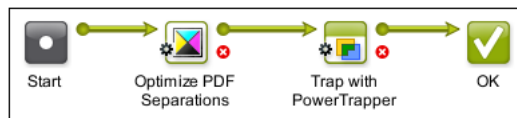
| Task	Task Type	Description
Optimize PDF Separations	PDF task	The PDF is processed directly, there is no normalization done.
Trap with PowerTrapper (Classic)	Normalized PDF task	The task detects that the input file is a regular PDF file, and first automatically normalizes it. Then, this normalized PDF is trapped and the output is a **self-contained Normalized PDF**.

The task ticket that is used for this **Automatic Normalization** can be selected in the **Configure** tool (Pilot: **Tools** > **Configure** > **Processing Preferences** > **Automatic Normalization**).
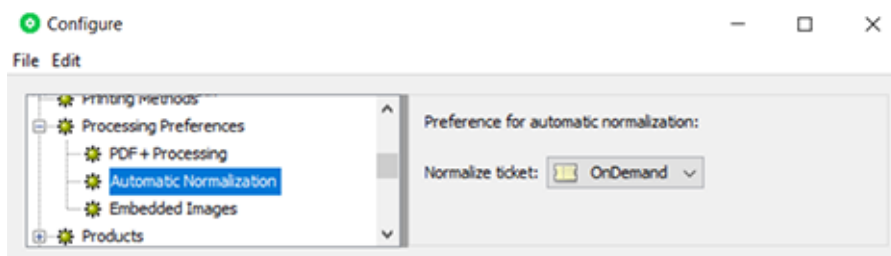
By default, Automation Engine uses the ticket named "**OnDemand**", a ticket of the *Normalize PostScript / PDF / Illustrator 8.0 File (Classic)* task.

> ⚠ **Attention:** From this ticket, only the settings in its tab **Color Management** are taken into account. All other settings of this automatic normalization are forced to fixed default settings. For example, automatic normalization will always embed all images.
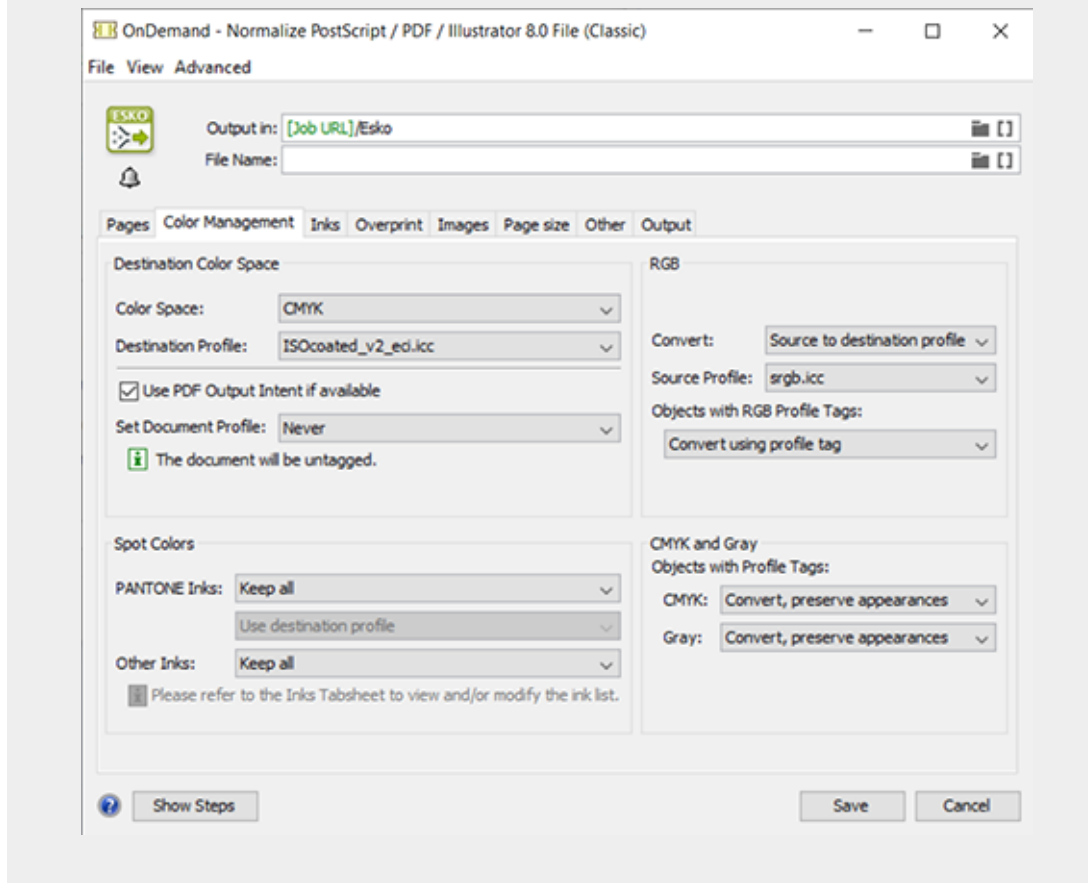
1.6. PDF Normalization and Step & Repeat

> ⚠ **Attention:** This page is not about the Step & Repeat tasks that use the ArtPro+ PDF+ graphics kernel. It only describes that the 'Classic' S&R tasks can also handle PDF native files but that this may include background normalization.

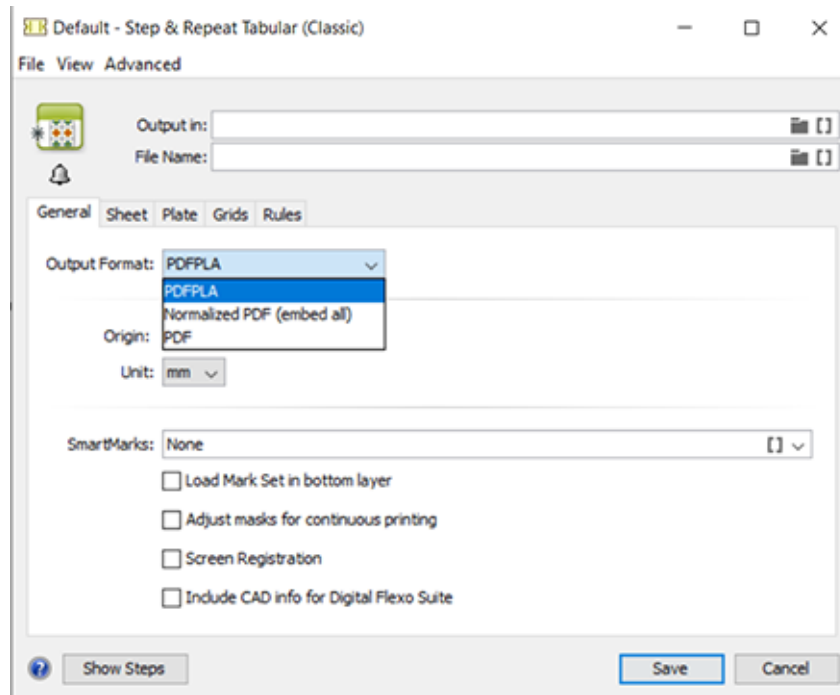The Step & Repeat **(Classic)** tasks support both regular PDF and Normalized PDF as input files, or even a mix of both.

The format of the task output file depends on your choice in the ticket.

Output Formats

Depending on your choice in the step & repeat ticket's setting **Output Format**, the format of the output file can be:

- a PDFPLA
- a self-contained Normalized PDF
- a native PDF

Output format PDFPLA

A PDFPLA is a Normalized PDF with external references to the one-ups, which also have to be Normalized PDFs.

A PDFPLA file can be edited and modified in Esko Plato. It can be RIP'ed directly by Esko Imaging Engine and FlexRip. To send it to a non-Esko system, first export the PDFPLA to a (self-contained) PDF using the *Export to PDF File (Classic)* task.

> **Note:** PDFPLA output can only be generated when all input files are Normalized PDFs, else the task will fail.

PDFPLA is the **recommended output format** when the primary purpose of the step & repeat file is to **send it to Imaging Engine or FlexRip**.

Output format Normalized PDF (embed all)

In this case, the task output file is a self-contained Normalized PDF. The one-ups are embedded in the PDF. The PDF technique 'PDF forms' is used so that the file size remains compact.

This file can not be modified in Esko Plato. It can be RIP'ed directly by an Imaging Engine or FlexRip. It can also be sent to a non-Esko system.

Normalized PDF inputs will be embedded in the output. PDF inputs will first be automatically normalized and then embedded in the output.

This format is **recommended when further processing is needed on the output**, for example by the task *Optimize PDF Separations (classic)* before sending it to Imaging Engine or FlexRip.

Output format PDF

When you choose this option, the output of the step & repeat task is a PDF. The one-ups are embedded in the PDF. The PDF technique 'PDF forms' is used so that the file size remains compact.

This file can not be modified in Esko Plato. Imaging Engine or FlexRip can not RIP this file directly ; they will first automatically normalize this step & repeat PDF file. This file can be sent to a non-Esko system.

Normalized PDF input files will be embedded in the output. PDF input files will be embedded in the PDF 'as is'.

This format is **recommended when the primary purpose** of the step & repeat file is to send it to a **third-party, a non-Esko RIP**.

1.7. Normalized PDF XMP Metadata (the File's Info Dialog)

XMP stands for 'eXtensible Metadata Platform', a *standard* defined by Adobe. XMP is a technology that allows embedding data *about* a file, known as metadata, *into* the file itself, in the format of XML.

Adobe uses XMP in its own applications like the **Creative Cloud** applications (Acrobat, Illustrator, InDesign, Photoshop, ...) and has defined a number of XML schema. The XMP framework was designed to be extensible so that other vendors like Esko can define additional schema and add their XMP metadata to the file as well.

When Esko applications *"normalize"* data, they also add XMP to the resulting PDF file. Files created by an Esko RIP also contain XMP.

An example: In the Pilot or browser client, the **Info** dialog shows you the XMP of the selected file (here a Normalized PDF):
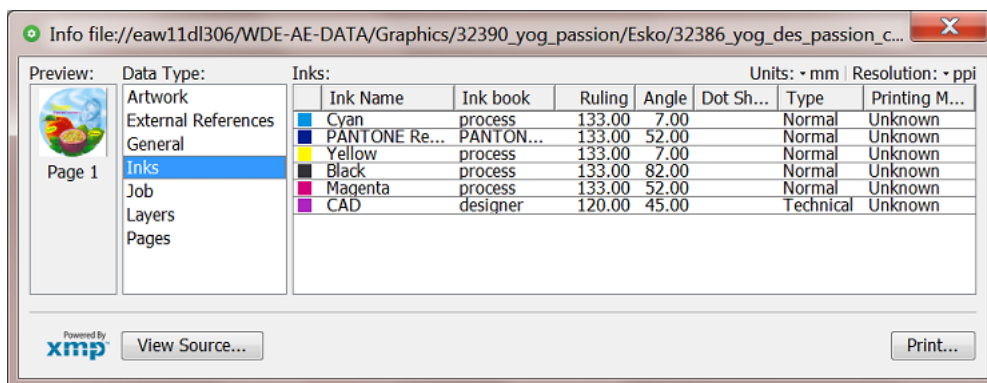
The XMP of a Step & Repeat file also shows basic info on its grids:
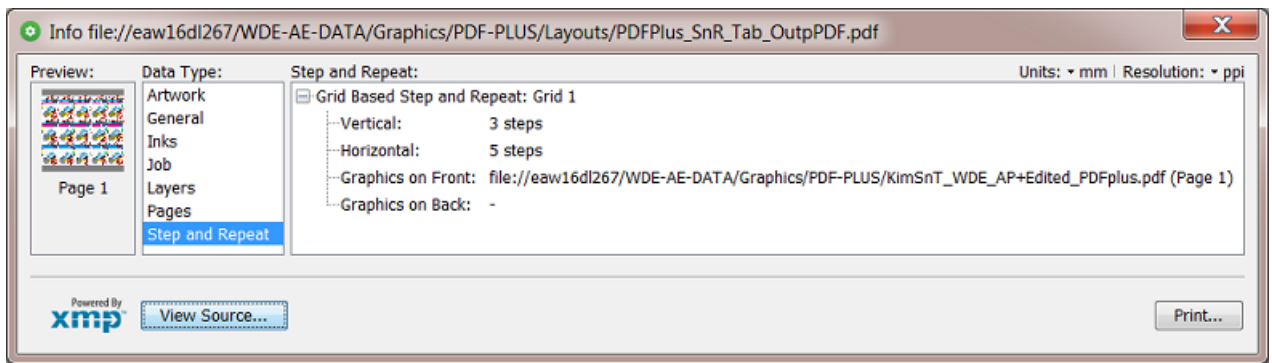
> **Note:** There are also Esko tools that generate regular native PDF files but still include the Esko XMP section:
> - PDF files generated by the DeskPack Data Exchange plug-in
> - PDF files generated by the Dynamic VDP tasks (i.e. not the 'classic' ones).

Some advantages of XMP:

- By only reading the XMP, you can learn a lot about the file without really opening the file.
- Quality control tools can read the metadata and compare specifications against actual values.
- Asset management applications can read the metadata and use this information to catalogue digital files for fast search and retrieval.

> **Attention:** There is no mechanism to detect modifications done in the PDF by non-Esko applications! When an external application edits the PDF (for example remove an ink), the file's Info dialog will still use the metadata from the XMP: i.e. the Esko XMP metadata is not invalidated.

> **Attention:** "**PDF proxy**" files are PDF files generated *from* an Esko Normalized PDF, for example for proofing or for remote exposure. The XMP data embedded in a PDF proxy is still the metadata of the Esko Normalized file from which that PDF proxy was derived.

Find the XMP specification in the separate document "XMP Metadata in Graphics Documents". Find this PDF *next to the Automation Engine documentation*, as part of the "**Related Documentation**". You will there also find the documents on XMP in RIP output ("XMP metadata in Digital Film Sets").

2. PDF+ in Automation Engine

2.1. PDF+, Successor of Normalized PDF

What is PDF+ ?

- PDF+ is the next generation internal graphics format in Esko applications.
- PDF+ is native PDF.
- The '+' in the name PDF+ means 'additional information'. It does not refer to a conversion.
- An important item in this additional information are the '**Processing Steps** and content' (*ISO 19593*).

> **Note:** ISO 19593 defines a new mechanism to store objects and metadata corresponding to finishing production steps in a PDF file in a standardized way. Based on this ISO standard, the use of Processing Steps was introduced in ArtPro+ as **Processing Step Layers**.

Giving layers the attribute of a type of processing step (for example the type 'embossing') enables to no longer use the attributes 'technical' and 'varnish' that you could set for 'Inks'. Those extra ink-type attributes are Esko proprietary attributes restricted to use in normalized PDF. PDF+ enables to skip using those and instead use this ISO conform way to use layers for this purpose.

- PDF+ is based on ISO 32000-1:2008, corresponding to the Adobe PDF 1.7 specification. Find an ISO approved version of the specification on *here*.
- Currently, PDF+ is the format used in and written by Esko ArtPro+ and several AE tasks.

> **Note:** *This KB article* also explains PDF+ from a more generic standpoint.

Why is PDF+ replacing Normalized PDF?

These are the 2 main reasons why PDF+ replaces Normalized PDF:

- The PDF format itself became more print-aware.
- The interoperability requirements became broader.

Some more specific advantages to have your Esko workflow use PDF+ :

- Any flavor of PDF is supported throughout the system (editor, workflow system, RIP).
- Editors and workflow server make no unnecessary changes to the PDF files.
    - They preserve 3rd party metadata.
    - They don't change the structure of the PDF file.
    - They only make the changes that the user requests.

Limitations of Normalized PDF

Normalized PDF has advantages, but also these limitations:

- Technical:
    - A Normalized PDF is 'fixed' to the capabilities of its 'BRIX' kernel. For example: in a multi-page PDF, mixed page sizes were never supported.

- A Normalized PDF always has its focus on print output (converting all RGB, …). Today's needs are broader.
- In the meantime several industry standards have emerged that serve the concept of normalization (PDF/X, …). And some of the semantics in Esko's Normalized PDF became outdated by ISO specifications (ink order, processing steps, …).

- Interoperability

  - The normalization process removes all 3rd party metadata.
  - Normalized PDF files were not designed to be modified by 3rd party tools. This means that the metadata can easily get out of sync.

Table: Small Overview of Esko's Graphical Formats and their Technology

Technology	BRIX	ArtPro	Enfocus PDF library	NDL (*)
File Format	Normalized PDF, PDFPLA, PDFSTA	ArtPro (.ap)	PDF	PDF+
Native Application	PackEdge, Plato, i-Cut Layout, various AE tasks. FlexRip kernel (read only)	ArtPro	PitStop tasks	ArtPro+

> **Note:** (*) 'NDL' stands for 'New Document Layer', an Esko R&D project name.

Find a much more detailed list of technologies in *Which AE task Uses which Technology?* on page 23.

FAQs

- **Q: In a native PDF workflow with PDF+ files, is there still a concept to "normalize" these PDFs?**

  - The concept to 'check and control' PDFs that enter your production flow is indeed still possible. In a native PDF workflow, we recommend Enfocus PitStop to do this. A typical example would be to use preflight tools to avoid RGB data in the production PDF.
  - The main difference with actual normalization to a different 'normalized PDF', is that the Enfocus tools give you full control over when and how this 'check' is done. Plus, your workflow is executed on the PDF that came in, not on a normalized variant PDF file. Automation Engine offers this technology through the *Preflight with PitStop Task*.

  - Another way to control PDFs that enter the workflow is to use the task *Apply PDF Action List*. This task allows to automate a linear series of functions that you would otherwise execute within ArtPro+.

- **Q: Can ArtPro+ work with Normalized PDFs?**

  - Sure. When, in ArtPro+, you open and edit a normalized PDF, it will by default save it again as a normalized PDF.
  - But you can as well choose to 'Convert To PDF+' and then save it as a PDF+ file.
  - Learn more in the user guide of *ArtPro+ (Working with Files > PDF, PDF+ and Normalized PDF)*.

- **Q: When you Step & Repeat PDF+ files, what is the output format?**

  - When you step & repeat PDF+ files in ArtPro+, the result is also saved as a PDF+ file.
  - When you step & repeat PDF+ files via tasks in Automation Engine, it depends if the task supports PDF+ files.

- When the task supports PDF+, the output will be a PDF+ file. This is for example the case for the S&R tasks that are not labeled 'Classic' (which, before AE 22, were named 'Dynamic').
- When the task does not support PDF+ (i.e. it is labeled 'Classic', because it uses the BRIX technology), then the PDF+ will first be normalized and the output will be a Normalized PDF or a PDFPLA file (depending on the output choice in the ticket).

> **Note:** PDFPLA files can only be made when it's one-ups are normalized PDFs.

> **Note:** Learn more about which AE tasks support the PDF+ technology in *Which AE task Uses which Technology?* on page 23.

- **Q: In a PDF+ file, Images and Placed Art can be 'Linked & Embedded'. Which data is used when?**
  - PDF+ is always self-contained ; images and placed art are always embedded. The actual image or art information is saved in the file, at its full resolution. The PDF+ file also keeps a time-stamp of when this data was embedded.
    - Optionally, they can also be linked. This means that a reference to the external file is saved in the PDF+ file. These links are not just to images or placed art but can also be to structural design files.

    > **Note:** In a normalized PDF file, you have to choose between embedding the data or only adding a link. You can not do both.

  Learn more on how to create and manage such links in the user guide of *ArtPro+*.

  - AE tasks always use the embedded data. Also a Step & Repeat task by default uses the embedded data.
  - An operator of AP+ or an AE task can choose to update that link. The task '*Apply PDF Action List*' can 'Update linked images', 'Update linked placed art' and 'Update structural design file'.

    > **Note:** Normalized PDF could contain an external reference in which case only a low res proxy was embedded in the PDF. As a result, the external referenced files had to be found and used to make final output.

2.2. Metadata in PDF+ (vs. XMP in Normalized PDF)

Why and How To Extract or read a PDF file's Metadata?

There are 2 main reasons why Esko workflows extract metadata out of their production PDFs:

- **To send this information to external systems**. Those systems interpret the XML and show these PDF attributes to their users.
  - **Normalized PDF** file: Use the task *Create PAF / JPG / XML (LinkEdge)(Classic)*. It was designed to export the XMP metadata that is on board a normalized PDF to an XML file.

  - **PDF(+)** file: Since v20, use the task *Export PDF Info* to export the metadata of a PDF+ to an XML file (and it can also create a preview image).

    > **Note:** This type of XML is aware of 'processing steps' , a typical attribute of PDF+ files.

> 📄 **Note:** The task *Create Report (ReportMaker)(Classic)* is an exception: Although it is based on BRIX technology used for normalized PDF, it can still read the metadata of a PDF+ file. That is why it can extract info from PDF+ files (inks, barcodes, external references, etc.) and it can also generate 3D previews (when the PDF+ file contains a CAD reference with 3D info).

- **To use this information to increase workflow automation**. Many users create SmartNames that extract metadata and then use it to increase the automation in a workflow.

  - SmartNames that extract XMP from normalized PDF files: *SmartNames that extracted a part of that XMP*.

  - There are no SmartNames that can extract metadata from PDF+ files. You can however use Xpath SmartNames on the exported XML file of its metadata.

In Normalized PDF, Metadata is proprietary and in XMP format

The *XMP metadata in Normalized PDF* is Esko specific. Additional and Esko specific information is stored in the open source XMP (extension schema). It's purpose is to make the PDF smarter for its packaging workflow.

The XMP data is added during Esko normalization and updated during Esko editing. It is visible in the Pilot, in the file's Info panel.

With PDF+, do we still Need to Add Metadata?

PDF+ uses standard PDF as much as possible. All the information that can be stored in the PDF structure (within the boundaries of the PDF imaging model), will be stored in that way. For example 'Ink Order', 'Processing steps', etc.

> 📄 **Note:** An illustration of this is that when, in ArtPro+, you convert a Normalized PDF to a PDF+, all its Esko proprietary XMP metadata is removed.

Not even PDF 2.0 will support all the concepts and terminology in packaging production. So until that will be the case, Esko will still add what is missing. As before, the reason is to enrich the file's information and enhance the workflow automation.

Only the information for which there is no support (yet) in standard PDF is defined in an Esko proprietary metadata scheme on board that PDF. This complimentary information is why this PDF is named PDF+ .

> ⚠️ **Important:** The metadata that Esko adds to a PDF+ is not XMP or XML, it is part of the PDF data stream itself.

> 📄 **Note:** The PDF+ specification adds metadata to any ISO 32000-1 compatible PDF file. Some of this metadata is purely additional ; there is no corresponding graphical representation in the PDF file, for example the position of the cross-hair. Other metadata describes how the actual graphical representation was generated, for example barcodes.

Overview of Metadata in PDF+ files

- Ink order
- Non-printing data (Cut, Die, ...) and special processing steps (varnish, ...)

- Ink Types
- Document Profile, as output intent
- Screening
- Crosshair position
- Group and Barcode metadata
- Marks
- Images
- Placed Art (PDF)
- Structural Design
- Preflight

The technical specification of this metadata, is described in the pages about the task that creates it: *Export PDF Info*.

> **Note:** Learn more in the *ArtPro+ user guide* (> Working with Files > PDF, PDF+ and Normalized PDF).

In PDF+, what happens to XMP metadata from 3rd parties?

With PDF+ (and also Normalized PDF), any **3rd party metadata is removed**. However, any 3rd party (non-Esko) **XMP (metadata) is kept** during the workflow, untouched.

2.3. PDF+ File's Info Dialog

The File Info dialog shows the PDF's metadata

When a PDF+ file is selected, the file Info dialog reads the metadata that Esko added to the PDF. Notice that, as this metadata is not XMP, that there is also no logo of the 'XMP technology' in the below left corner of this dialog.

> **Note:** Notice these main differences with the info dialog of a Normalized PDF (which is based on XMP):
>
> - The data type 'Inks' is here split over **Separations** and **Screen sets**.
>
> - The data type 'External References' is here listed as **Placed Art / Images**.

PDF+ Info Dialog Examples per Data type

- **Artwork**
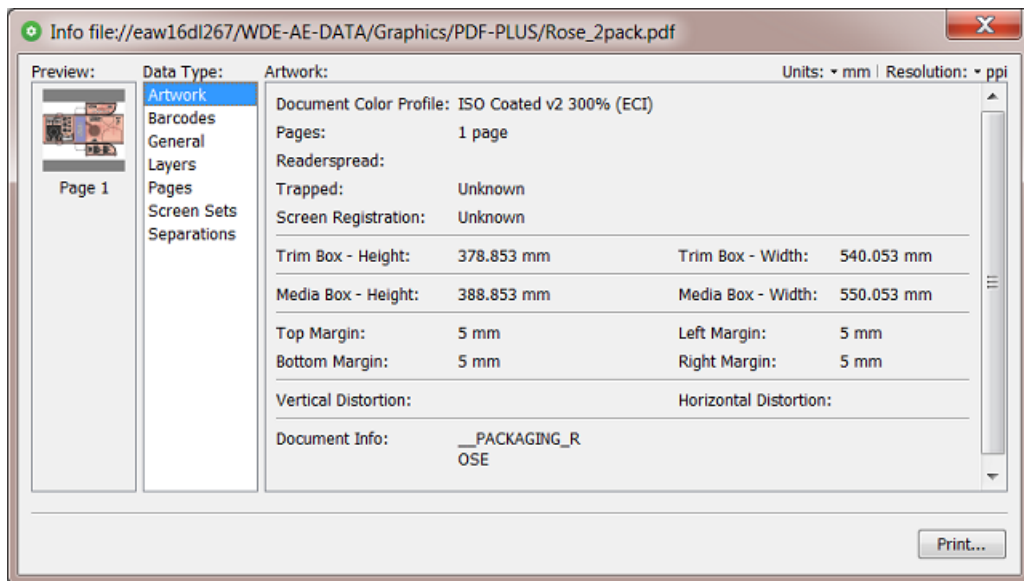
Note: The value of the field '**Trapped**' is based on a check if this flag is present in the PDF description ; it does not check the presence of a trapping layer or trapping objects.

- **Barcodes**
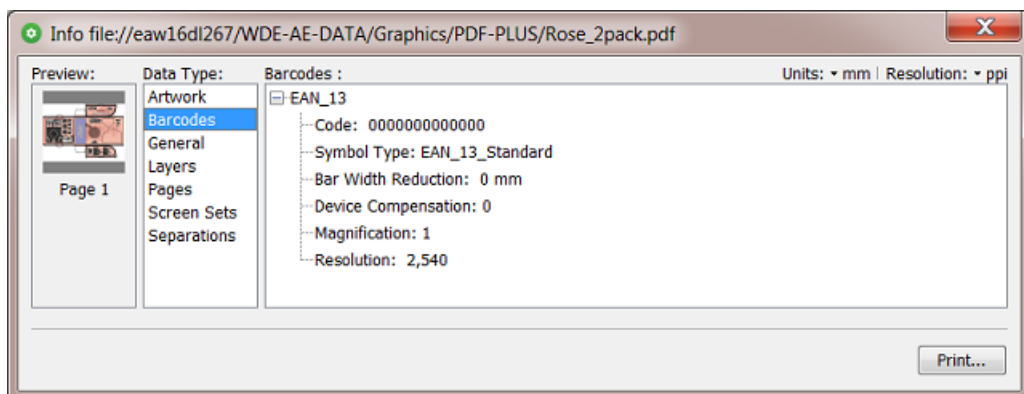
When the PDF contains barcodes that were created with Esko tools, their parameters will appear here.

- **Fonts**

Fonts are either **embedded**, **embedded subset** or **not embedded**.

- **General**
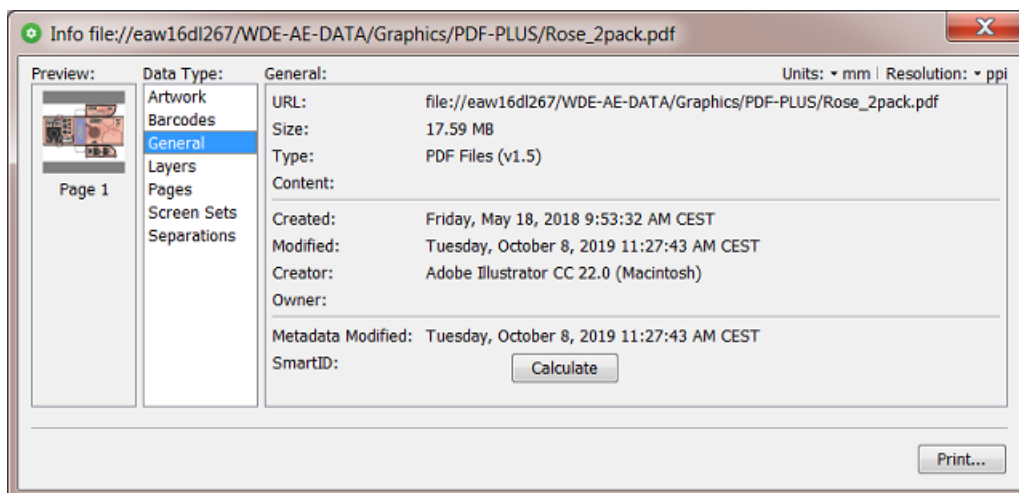
SmartID: Click **Calculate** to have the system calculate the unique identification number for that version of this file. This number is calculated from the combination of an identifier of the document itself and of the identifiers of all its external references.

> **Note:** You can for example use its *SmartName* to place this 'SmartID' on the proof (file). When the customer approves what he sees on the proof, he then actually approves that ID. That ID is then also a number that you can make appear on the plate or print, so proving that the file that was considered 'good for print' has not changed in the meantime.

• **Layers**
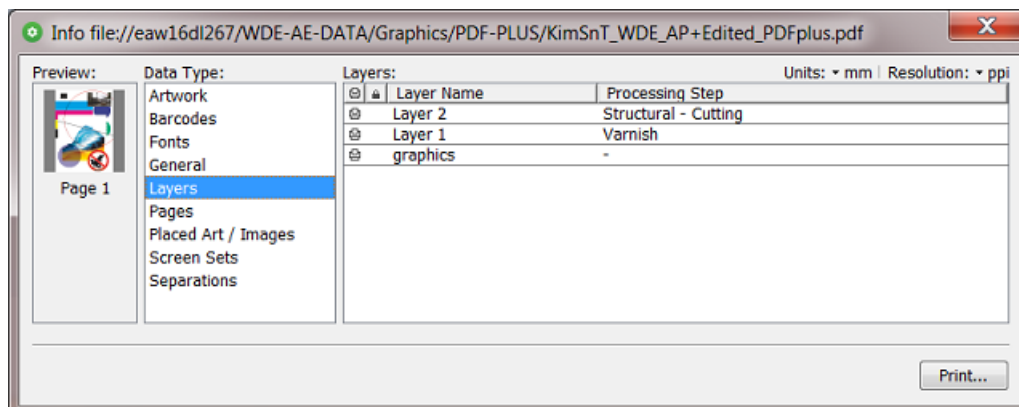
In PDF+, a layer can be of the type **Processing Step**.

Learn about all types in *Processing Steps - Groups and Types* on page 21.

• **Pages**

Their number and their inks (separations).

• **Placed Art / Images**

Placed Art or Images are always embedded in the PDF. If there is also a link to their original data present in this PDF, they appear in this list:
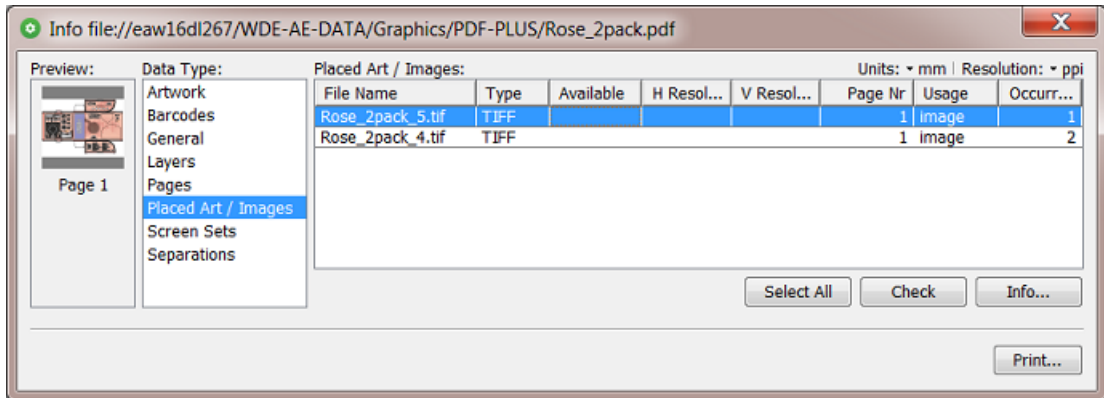
Click **Check** to check this link, i.e. the availability of the selected file(s). The result can show that the embedded data of that link are **Up-to-date**, **Not Up-to-date** or **No** (not available).
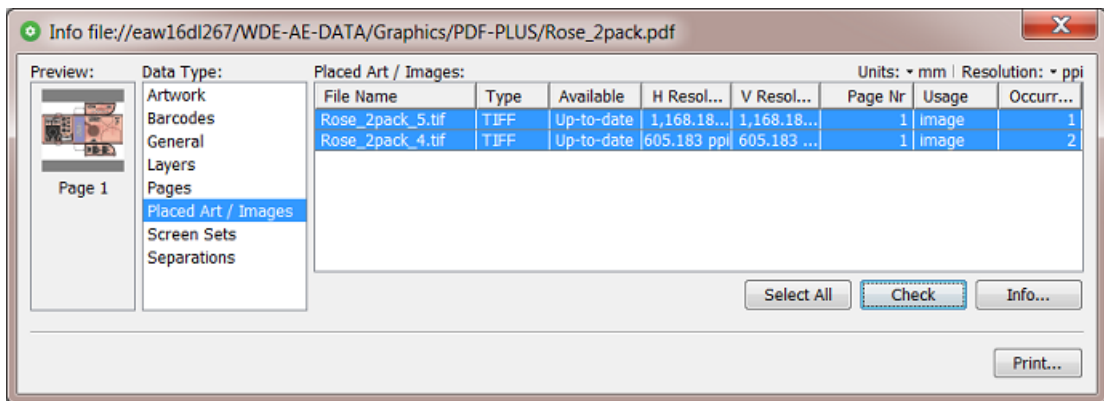
Click **Info...** to open the info dialog of the selected placed art or image(s).

- **Screen Sets**
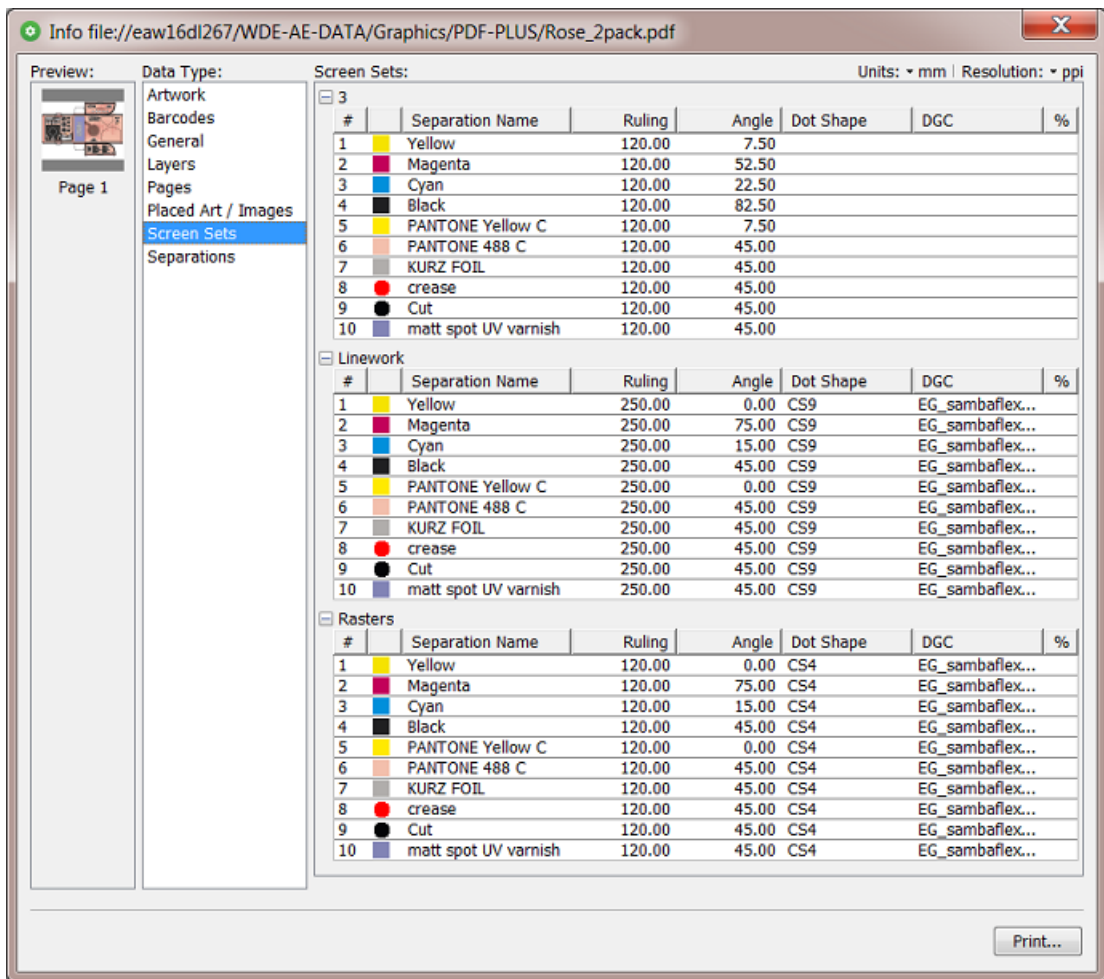
This example has 3 different sets of screens: one at ruling 120 LPI, one at ruling 250 LPI using the dot CS9 and one at 120 LPI using the dot CS4.

• **Separations**
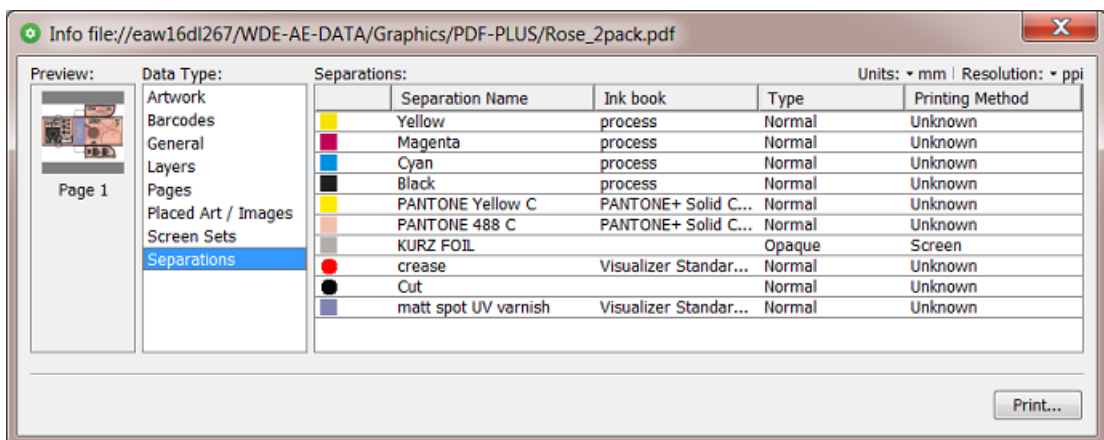
- **About 'Colorants'**: Separations that are only used in Processing Step Layers are considered 'Colorants': they can be used to color objects in the Processing Step Layers, but are not considered printing inks, as they should not appear on plates or on the final printed result.

  Colorants for Processing Step Layers are represented using a round color patch.

  > **Note:** In normalized PDF files, these were often indicated as 'technical inks'.

- **Structural Designs**:

  This data type only appears when any such files were placed in the PDF. These can be ARD, one-up CF2, ZAE or DAE files.

  > **Note:** Placing ZAE or DAE files requires v20 or higher of ArtPro+ .

  When a cad file was placed, there is always a link.

  Selecting them also allows to check their availability.

The Info Summary dialog

When you select more than one file, and then right-click (or use the **File** menu), you can choose between **Info** and **Summary**.

- When you selected 10 or less files, 'Info' will open the various 'Info' dialogs.
- When you selected between 11 and 20 files, you will see a list of files, and an 'Info' panel of the file selected in that list.
- When you selected more than 20 files, you always get a 'Summary' dialog:

| File Name	Vertical Size	Horizontal...	Top Margin	Bottom M...	Left Margin	Right Margin
trappist.pdf	750 mm	1,800 mm	10 mm	10 mm	10 mm	10 mm
tomatn.pdf	750 mm	1,800 mm	10 mm	10 mm	10 mm	10 mm
sla.pdf	750 mm	1,800 mm	10 mm	10 mm	10 mm	10 mm
sjalot.pdf	750 mm	1,800 mm	10 mm	10 mm	10 mm	10 mm
pils.pdf	750 mm	1,800 mm	10 mm	10 mm	10 mm	10 mm
pepers.pdf	750 mm	1,800 mm	10 mm	10 mm	10 mm	10 mm
melk.pdf	750 mm	1,800 mm	10 mm	10 mm	10 mm	10 mm
look.pdf	750 mm	1,800 mm	10 mm	10 mm	10 mm	10 mm
komkomm...	750 mm	1,800 mm	10 mm	10 mm	10 mm	10 mm
koffie.pdf	750 mm	1,800 mm	10 mm	10 mm	10 mm	10 mm
kaas.pdf	750 mm	1,800 mm	10 mm	10 mm	10 mm	10 mm
eiers.pdf	750 mm	1,800 mm	10 mm	10 mm	10 mm	10 mm
collection.pdf	750 mm	1,800 mm	10 mm	10 mm	10 mm	10 mm
buffaloooo...	206.162 mm	260.68 mm	10 mm	10 mm	10 mm	10 mm
broccoli.pdf	750 mm	1,800 mm	10 mm	10 mm	10 mm	10 mm
boter.pdf	750 mm	1,800 mm	10 mm	10 mm	10 mm	10 mm
all.pdf	297 mm	210.002 mm	0 mm	0 mm	0 mm	0 mm
ajuin.pdf	750 mm	1,800 mm	10 mm	10 mm	10 mm	10 mm
2019.pdf	70 mm	73 mm	0 mm	0 mm	0 mm	0 mm
3_lemon.pdf	750 mm	1,800 mm	10 mm	10 mm	10 mm	10 mm
2_banana....	750 mm	1,800 mm	10 mm	10 mm	10 mm	10 mm
1_coco.pdf	750 mm	1,800 mm	10 mm	10 mm	10 mm	10 mm

Data Type: Artwork, Barcodes, Fonts, General, Ink Coverage, Inks/Separations, Job, Layers, Pages, Placed Art / Images, Screen Sets, Structural Designs

2.3.1. Processing Steps – Groups and Types

Groups

In the ISO norm, types of processing steps are grouped as follows:

- **Structural Data**: A collection of contours that describe how the printed product will be finished to produce a 3D end product from a flat substrate. These are as lines defining cutting, creasing, folding etc. The types of this group are listed below.
- **Positions**: Objects that indicate intended, allowed or forbidden positions for certain types of elements. For example the positions on a flap of a carton where content is allowed. The types of this group are listed below.
- **Braille**: Braille characters that are applied after printing, typically by a die cutter or inkjet device.
- **Legend**: Job related data added outside the boundaries of the actual printed products.
- **Dimensions**: Indications of the physical sizes.
- **White**: White ink to be printed on a transparent or metallic substrate.
- **Varnish**: Indicating the application of varnish after printing.

Types of the group 'Structural Data'

Group	Type	Description
Structural Data	Cutting	Processing step objects indicating where the printed artwork will be cut from the printed sheet e.g. with a guillotine cutter or die cutting device.
Structural Data	PartialCutting	Processing step objects indicating where the substrate will be cut partially i.e. not entirely through the material.
Structural Data	ReversePartialCutting	Processing step objects indicating where the substrate will be cut partially i.e. not entirely through the material on the back side of the substrate.
Structural Data	Creasing	Processing step objects indicating where the substrate will be creased to guide subsequent folding.
Structural Data	ReverseCreasing	Processing step objects indicating where the substrate will be creased on the back side of the substrate.
Structural Data	CuttingCreasing	Processing step objects indicating where the substrate will undergo alternating cutting and creasing.
Structural Data	ReverseCuttingCreasing	Processing step objects indicating where the substrate will undergo alternating cutting and creasing on the back side of the substrate.
Structural Data	PartialCuttingCreasing	Processing step objects indicating where the substrate will undergo alternating partial cutting and creasing.
Structural Data	ReversePartial-CuttingCreasing	Processing step objects indicating where the substrate will undergo alternating partial cutting and creasing on the back side of the substrate.

Group	Type	Description
Structural Data	Drilling	Processing step objects indicating locations where the substrate will be drilled and the intended size of the resulting hole.
Structural Data	Gluing	Processing step objects enclosing an area where glue will be applied.
Structural Data	FoilStamping	Processing step objects enclosing an area where foil will be applied through hot foil stamping.
Structural Data	ColdFoilStamping	Processing step objects enclosing an area where foil will be applied through cold foil stamping (i.e. using glue).
Structural Data	Embossing	Processing step objects enclosing an area where embossing will be applied.
Structural Data	Debossing	Processing step objects enclosing an area where debossing will be applied.
Structural Data	Perforating	Processing step objects indicating where the substrate will be perforated.
Structural Data	Bleed	Processing step objects indicating the intended bleed for print.
Structural Data	VarnishFree	Processing step objects enclosing an area where it is not allowed to have varnish.
Structural Data	InkFree	Processing step objects enclosing an area where it is not allowed to have printing ink.
Structural Data	InkVarnishFree	Processing step objects enclosing an area where it is not allowed to have printing ink and where it is not allowed to have varnish.
Structural Data	Folding	Processing step objects indicating where the substrate will be folded without prior creasing.
Structural Data	Punching	Processing steps objects indicating the locations at which the substrate will be punched and the size and shape of the resulting holes.
Structural Data	Stapling	Processing steps objects indicating the locations at which the substrate will be stapled or stitched, and the size of the staples or stitches to be used.

Types of the group 'Positions'

Group	Type	Description
Positions	Hologram	Processing step objects that indicate the intended position of holograms.
Positions	Barcode	Processing step objects that indicate the intended position of barcodes.
Positions	ContentArea	Processing step objects that indicate areas where it is allowed to place text and other graphical elements.

Group	Type	Description
Positions	CodingMarking	Processing step objects specific to packaging that indicate areas where additional information not contained in the PDF will be printed on the packaging at a post-press stage, such as on filling lines where final products are being packed. Some examples of information that might be marked as CodingMarking include but are not limited to best before dates, lot numbers, production dates, and tracking codes.
Positions	Imprinting	Processing step objects that indicate areas where additional information (e.g. variable data) will be printed on pre-printed shells which contain the bulk of the graphical content, as a secondary print stage prior to finishing.

2.4. Which AE task Uses which Technology?

In the above page *PDF+, Successor or Normalized PDF*, we already introduced the graphics software kernels that are used in Automation Engine.

We here add more detail.

Graphics Software Kernels used in Automation Engine

- **NDL – the ArtPro+ kernel**

  'New Document Layer' is the Esko R&D project name given to the native PDF kernel that is used in ArtPro+. This is the latest graphics kernel used by Esko.

  For example: The tasks *Add Dynamic Marks*, *Create PDF Report*, *Export PDF Info* and the 3 Step & Repeat tasks.

  > 📄 **Note:** Before AE 22, the name of many of this type of tasks had a suffix **'(Dynamic)'**. This was because the first of these tasks were also the first ones using Dynamic Marks (and not SmartMarks).

- **NDL *** – ArtPro+ PDF Action Lists used in AE tasks**

  An ArtPro+ operator can, apart from using the interactive editing tools, also execute Action Lists: a series of actions executed interactively on his open file. To also enable executing such action lists also in background on Automation Engine, the NDL kernel is made available on AE, there wrapped in what is called the "PDF Action List Processor" (a.k.a. 'PAL Processor').

  AE task types that use this PAL Processor mention this in their ticket dialog ; they are '**Powered by PDF Action List Processor**'.

  For example: The tasks *Trap*, *Optimize PDF*, *Apply PDF Action List*.

  In the table below we marked these tasks with an '***'.

  In next versions of AE, more tasks will use this technology.

> **Note:** These tasks use the PDF Action List processor that is installed on your Automation Engine. When you use a very recent version of ArtPro+ (maybe a test version or one that was released after the latest release of your AE), you might need to update the PDF Action List processor that came by default with your AE. You will find this processor as a separate install on *https://mysoftware.esko.com/*. Download and update this PAL processor when required.

- "**Classic**" technologies.

> ⚠️ **Attention:** Since Automation Engine 22, the name of the task type has a suffix **'(Classic)'** when it is not (only) using the PDF+ graphics engine that is used in ArtPro+ (see below). These classic tasks use normalization technology or native formats like ArtPro, technologies that since AE 22 we refer to as 'classic' technologies.

- **BRIX**

  For example used by the classic tasks 'Trap with PowerTrapper', 'Add SmartMarks', 'Export Gang Run Layouts', 'Manage Color'.

  - **BRIX ***

    Some BRIX tasks have a special behavior. We marked them in the table below with an '*'.

    These BRIX tasks can handle native PDF in and out *without* normalizing it. These are:

    - The i-cut tasks. This for example allows i-cut workflow users to keep RGB data till output.
    - The Step & Repeat tasks that are labeled 'Classic' and that offer the output format 'PDF' in their ticket.

- **ArtPro**

  The proprietary ArtPro format. For example used by the classic task 'Apply ArtPro Action List' (AP file in, AP file out).

- **Enfocus**

  - **Enfocus PitStop**

    The task 'Preflight with PitStop' and 'Verify Certification' use the PitStop Server software on board Automation Engine.

    Normalized PDF files can only be preflighted when, in the preflight profile, the option "Allow fixes" is switched off. PDF Action Lists can never be executed on Normalized PDF files.

  - **Enfocus library ****

    Next to PitStop, Automation Engine also uses an other Enfocus software library to execute prepress tasks on PDF. We marked them in the table below with an '**'.

    For example the classic tasks 'Optimize PDF Document', 'Optimize PDF Pages', 'Extract Inks'.

    These tasks can be launched on normalized PDF as well.

- **Other / none**. These tasks do not use any of the above mentioned graphics kernels. For example the tasks 'Copy or Move File', 'Create XML', 'Create Job', Some even use 3rd party technology, like the 'ZIP', tasks or the various Inspection tasks powered by GlobalVision, etc.

Which Graphics Kernel does this Task use?

* = BRIX tasks that can handle native PDF (without normalizing on the fly).

** = Enfocus PDF library for prepress tasks (not using PitStop).

*** = Powered by PDF Action List Processor. These use the PAL Processor installed on the AE server.

Task name	BRIX	ArtPro	Enfocus	NDL	Other
Add Dynamic Marks				V	
Add Ink Eaters (Classic)	V				
Add Margins to LEN File					V
Add Marks to Imposition					V
Add Parameters for Nesting (Classic)	V *				
Add SmartMarks (Classic)	V				
Add to Pages View (Classic)					V
Add to Products					V
Adjust PDF Screening (Classic)			V **		
Apply ArtPro Action List (Classic)		V			
Apply Creep					V
Apply PantoneLIVE Condition (Classic)			V **		
Apply PDF Action List				V ***	
Apply Plate ID to LENX File					V
Archive Job					V
Assign PDF Pages to RunList					V
Calculate Ink Key Settings (CIP3)					V
Calculate Ink Key Settings (InkPlanner)					V
Change Imposition Layout					V
Check Dynamic VDP Database					V
Check Job Parameters (Classic)	V				
Check Print Rules (PRC) (Classic)	V				
Check Product Parameters (Classic)	V				
Check Technical Inks (Classic)	V				
Compare PDF (Classic)			V **		
Contourize & Clean (Classic)	V				
Convert CMYK Colors (Classic)	V				
Convert Colors for Digital Printing (Classic)	V				
Convert Colors with Equinox (Classic)	V				
Convert IMP File to Normalized PDF File (Classic)	V				
Convert JSON to XML					V

Task name	BRIX	ArtPro	Enfocus	NDL	Other
Convert Selection					V
Convert to ARD/MFG					V
Convert XML to JSON					V
Copy or Move File					V
Create ArtiosCAD Layouts					V
Create ArtiosCAD Report from XML					V
Create Design (DesignWizard)(Classic)	V				
Create IMP File (Classic)	V				
Create Imposition from JDF Layout					V
Create Imposition from RunList					V
Create Imposition Sheet Report					V
Create Imposition					V
Create Job Report					V
Create Job					V
Create Master DCS File (Classic)	V				
Create Merged Plate					V
Create or Modify WebCenter Project					V
Create Packshot from XML					V
Create PAF / JPG / XML (LinkEdge)(Classic)	V				
Create Flexo Plate Cutting Paths				V ***	
Create PDF File from JDF RunList (Classic)			V **		
Create PDF File from RunList					V
Create PDF Report				V	
Create Report (ReportMaker)(Classic)	V				
Create RunList from PDF					V
Create RunList					V
Create Sheet Layout (Classic)	V				
Create or Modify WebCenter Project					V
Create Sheet Layout (Classic)	V *				
Create Tiles (Classic)	V *				
Create Wrapper File (Classic)	V				
Create XML File					V
Crop LEN File					V
Delete File					V

Task name	BRIX	ArtPro	Enfocus	NDL	Other
Delete Product on Esko Cloud					V
Download Files from Shared Job					V
Download Product from Esko Cloud					V
Download WebCenter Document					V
Enrich Black (Classic)	V				
Expand Dynamic VDP Data				V	
Expand Variable Data to PPML File (Classic)	V				
Expand Variable Data to PPML File (DeskPack only) (Classic)	V				
Export ArtiosCAD Design Info					V
Export ArtPro to Normalized PDF File (Classic)		V			
Export IMP File to ...					V
Export Imposition to ...					V
Export Kongsberg Cutting History					V
Export Gang Run Layouts	V *				
Export PDF Info				V	
Export Step & Repeat to JDF Layout (Classic)	V				
Export Step & Repeat to JDF Layout				V	
Export to 3D (Classic)	V				
Export to ArtPro File (Classic)	V				
Export to EPS/DCS File (Classic)	V				
Export to Gravure using HELL Job Ticket				V	
Export to Normalized File (DeskPack Only) (Classic)	V				
Export to Normalized PDF File (Classic)	V				
Export to PDF File (Classic)	V				
Export to PostScript File (Classic)	V				
Export to Unscreened Separations				V ***	
Extract Inks			V **		
Fill Printing Lanes					V
Generic Brix (Classic)	V				
Image to Content Proof (RGB)					V
Image to Unscreened Proof					V
Image to screened/unscreened separations					V
Import Die					V

Task name	BRIX	ArtPro	Enfocus	NDL	Other
Import Image (Classic)	V				
Import JDF Layout (Classic)	V				
Import JDF Step & Repeat (Classic)	V				
Import JDF Stripping					V
Import Order Material from XML					V
Import Substrate Sizes from XML					V
Inspect … (GlobalVision tasks)					V
Integrate via External Hot Folder					V
Integrate with WebCenter					V
Interact using JDF					V
Interact using JMF					V
Interact with Database					V
Interact with SAP					V
Interact with Web Service					V
Join XML Files					V
Link Product to Job					V
Load Structural File (Classic)	V				
Manage Color (Classic)	V				
Manage Milestone					V
Manage Product Status					V
Map Data					V
Mark as Proof					V
Mark File					V
Merge PDF Files (Classic)			V **		
Merge PDF Files				V	
Normalize PDF File (Classic)			V **		
Normalize PostScript / PDF / Illustrator 8.0 File (Classic)	V				
Normalize TIFF/IT File (Classic)	V				
Optimize and Clean (PSFix) (Classic)	V				
Optimize PDF Document (Classic)			V **		
Optimize PDF Separations (Classic)			V **		
Optimize PDF				V ***	
Outline Fonts (Classic)	V				

Task name	BRIX	ArtPro	Enfocus	NDL	Other
Preflight Color for Digital Printing					V
Preflight Color for Equinox	V				
Preflight with PitStop			V		
Prepare for Inspection (Classic)			V **		
Prepare for Sharing				V***	
Prepare for Viewer	V				
Prepare Graphics for Nesting (Classic)	V *				
Prepare Station (Classic)	V				
Proof for Content Approval					V
Proof for Contract Approval					V
Proof Imposition (FlexProof)					V
Process PDF Spreads (Classic)			V **		
Publish Imposition on WebCenter Chain					V
Publish on WebCenter	V				
Relocate Job					V
Remove Files from Shared Job					V
Remove Job					V
Remove Product					V
Resize PDF for Output (Classic)			V **		
Resize Shape					V
Resolve OPI (Classic)			V **		
Restore Job					V
Reverse Trap				V***	
Run ArtiosCAD Standard					V
Run Script					V
Select Files on Shared Job					V
Select File					V
Send E-mail					V
Share Job					V
Split PDF File (Classic)			V **		
Split XML File					V
Start Approval Cycle on Share & Approve					V
Step & Repeat CAD based (Classic)	V *				
Step & Repeat CAD based				V	

Task name	BRIX	ArtPro	Enfocus	NDL	Other
Step & Repeat Tabular based (Classic)	V *				
Step & Repeat Tabular				V	
Step & Repeat Template based (Classic)	V *				
Step & Repeat Template based				V	
Submit to Esko DFE					V
Submit to Flexo Device					V
Submit to Gang Run (Classic)					V
Submit to HP SmartStream Production Pro Print Server					V
Submit to Kongsberg Table					V
Submit to Plate Merger					V
Submit XML to Gang Run (Classic)					V
Synchronize ArtiosCAD Boards					V
Synchronize ArtiosCAD Companies					V
Trap with PowerTrapper (Classic)	V				
Trap				V ***	
Unshare Job					V
Unzip					V
Upload Files to Shared Job					V
Upload Files to Share & Approve					V
Upload Product to Esko Cloud					V
Upload to Cloud Storage					V
Upload to SFTP					V
Upload via FTP					V
Verify Certification			V		
Version PDF (Classic)			V **		
Wait for Action (Checkpoint)					V
Wait for Approval on Share & Approve					V
Wait for Files (via JDF)					V
Wait for Files					V
Wait for Product Status					V
Wait					V
Zip					V

* = BRIX tasks that can handle regular PDF (without normalizing on the fly)

** = Enfocus PDF library for prepress tasks (not using PitStop)

*** = Powered by PDF Action List Processor. These use the PAL Processor installed on the AE server.

2.5. Workflow and Current Limitations

PDF+ Workflow

A native PDF workflow in Automation Engine (or Imaging Engine) is one where the one-up PDF stays a PDF+ during all typical prepress steps.

Such a workflow requires that all its prepress tasks need to use the PDF+ technology (the NDL kernel) so that the production PDF file stays a PDF+ file.

> **Note:** Of course many Automation Engine tasks do not use any graphics kernel (see the *list above*).

However, Esko can not offer all migrated technology in one go, in one software update. Until then, you may have to rely on **mixed workflows where NDL tasks are used in combination with BRIX tasks and/ or Enfocus PDF tasks**.

This means that, in the current version of Automation Engine, your workflow may still need tasks that normalize the PDF. Some of those tasks will do that all the time and also do it explicitly (creating *also* a normalized PDF). Some will do that hidden, on-demand (a first stage of the task that starts by creating a hidden and temporary, normalized PDF).

In next versions of Automation Engine, the need to create normalized PDF files in a workflow will eventually become an exception. This will be done both by adapting BRIX based tasks and by introducing new NDL based tasks.

Current Limitations

When opening or using a PDF+ file as input, the current version of Automation Engine and these tools will still normalize the PDF file:

- **Esko tools / applications** that will normalize in this same version:
  - Classic editors PackEdge, ArtPro, Plato, i-cut Layout

    > **Note:** i-cut Layout ignores the metadata in PDF+ files, i.e.: the extra metadata is not used.

  - Esko Viewer (in AE Pilot, browser client or WebCenter)
  - FlexRip, FlexProof
  - Imaging Engine
  - WebCenter (tasks, workflow)
  - Share & Approve

- **AE Tasks** that will still normalize:

  See them listed above in *Which AE task Uses which Technology?* on page 23.