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Ghent  
Workgroup

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**All you ever wanted to  
know about Transparency,  
but were afraid to ask!**

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**Andrew Bailes-Collins**

Co-Chair Specifications Committee

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GWG Technical Officer

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Senior Product Manager - Enfocus



## Recording and Demo files

The session is being recorded and will be available

The demo files will also be made available

# Next webinar



## Q&A/Problem Solving Webinar

**Tuesday May 19th, 2020 at 4pm CET / 10am ET**

Have you recently encountered a problem in your print, packaging or publishing workflow and you don't seem to find an easy solution? Ghent Workgroup might be able to help you out. We have put together a panel of specialists of vendor, association and industry representatives that will sit together during our **Q&A webinar on Tuesday May 19th, 2020 at 4pm CET** and that will answer all your questions.

Please click here to let us know what your question is.

presented by:

A panel of specialists:

- Andrew Bailes-Collins (*Sr Product Manager Enfocus / Co-chair Specifications Subcommittee GWG*)
- Carl Van Rooy (*Senior Innovation Consultant VICG/ Vice Chair GWG*)
- Christian Blaise (*CEO & Founder agileStreams / Marketing Officer GWG*)
- David Van Driessche (*CTO Four Pees & callas software / Executive Director GWG*)
- Frank Vyncke (*Senior Software Architect HYBRID Software / Treasurer GWG*)

**Register  
Here**

Webinar Registration: <https://register.gotowebinar.com/register/1051862498134235917>

Upload of question at: <https://surveyhero.com/c/1de0faac>

# Who is GWG?



An international organization made up of graphic arts users, associations & developers



A cross-section of the international graphic arts community's best minds

## Educational members



HEIDELBERG



University of Ljubljana  
Faculty of *Natural Sciences and Engineering*



## Industry members

Vendor members

Association members



## Our goals

Be a Premiere Graphic Arts Think-Tank



- Identify issues, share ideas and create solutions
- Unify and standardize PDF creation and preflight settings
- Find better ways to process and exchange graphic art files



## Our goals

Collaborating to help our partners be successful

- Introduce practical workflow tools
- Streamline daily production tasks
- Provide technical background
- Create specifications
- Share best practices
- Develop industry solutions

# Why join the Ghent Workgroup?

- Learn
  - ✓ Access a wealth of members-only information
  - ✓ Acquire first-hand information on standards and settings
  - ✓ Get first-hand access to information on new developments in the industry
  - ✓ Join webinars presented by industry experts
- Network
  - ✓ Attend 3 member meetings each year
  - ✓ Take part in free international seminars
  - ✓ Have direct access to leading vendor members in our industry



# How can you participate?

- Attend a meeting as an observer

## Upcoming meetings:

May 6-8, 2020, Novi Sad, Serbia (online)

October 14-16, 2020 New York, USA

February 17-19, 2021 Belgium

June 2-4, 2021 Ljubljana, Serbia

Apply for observer status and attend 2 meetings for free

- Join a subcommittee
- Become a member



# **Andrew Bailes-Collins,**

*Senior Product Manager – Enfocus*

*Technical Officer, Ghent Workgroup*

*Co-chair Preflight Specifications Committee, Ghent Workgroup*

*ISO TC130 member (Graphic Arts Standards)*



Andrew graduated from what is now the London College of Communications and went on to serve an apprenticeship as a Composer.

He has worked for a number of vendors in the printing and publishing sector, including Scangraphic, Apple, and DuPont/Crosfield.

He has been Prepress Manager for several high quality printing companies in London, managing the change from conventional production techniques to digital. An early adopter of computer-to-plate and PDF workflow, Andrew then worked at OneVision Software for ten years.

Initially based in the UK, before rising through the company to become Head of Product Management Europe at their head office near Munich in Germany.

Andrew joined Enfocus and moved to Belgium in 2011 and is the Senior Product Manager responsible for the PitStop family of products.



## Thanks to:

**Peter Kleinheider** - Calibrate.at

**Peter de Bruyne** – Enfocus

**Ben Schumeth** - Enfocus

**Mark Lewiecki** - Adobe

**Jason Lisl** – Ryerson University

Transparency Best Practices White Paper

<https://www.gwg.org/members/transparency-best-practices/>



# Agenda

- **History**
  - Transparency
  - PDF/X
- **Transparency**
  - Blend Modes
  - Blend Spaces
- **Groups**
  - Knockout
  - Isolated
  - Page
- **Flattening**
  - How
  - What
  - Atomic Regions
  - Overprint
  - Spot Colors
  - Fonts
- **Benefits of Live Transparency**
- **GWG Preflight**
- **Best Practices**



## Transparency defined

- Transparency is an effect applied to an object causing it to appear transparent and letting objects underneath show through.
- Some prepress people have their own, more imaginative ways to describe it! 😊

# Historically

## 2001

PDF 1.4 was the first version of the PDF specification that supported transparency  
Adobe Acrobat 5 was released, the first version of Acrobat to support transparency  
At that time Rips were postscript based (CPSI), so flattening had to be done 'in application'

## 2002

Global Graphics released Harlequin v6.0 with PDF 1.4 support and rendering of live transparency in-rip

## 2006

Adobe PDF Print Engine (APPE) released, native PDF renderer

# Historically – PDF Standards

## 2001

ISO 15930-1:2001: **PDF/X-1a:2001**, blind exchange in CMYK + spot colors. Based on **PDF 1.3**

## 2002

ISO 15930-3:2002: **PDF/X-3:2002**, allows CMYK, spot, calibrated (managed) RGB, CIELAB, with ICC Profile. Based on **PDF 1.3**.

## 2003

ISO 15930-4:2003: **PDF/X-1a:2003**, revision of PDF/X-1a:2001. Based on **PDF 1.4**

## 2008

ISO 15930-7:2008: **PDF/X-4**, Colour-managed, CMYK, gray, RGB or spot colour data are supported, as are **PDF transparency** and optional content. Based on **PDF 1.6**.

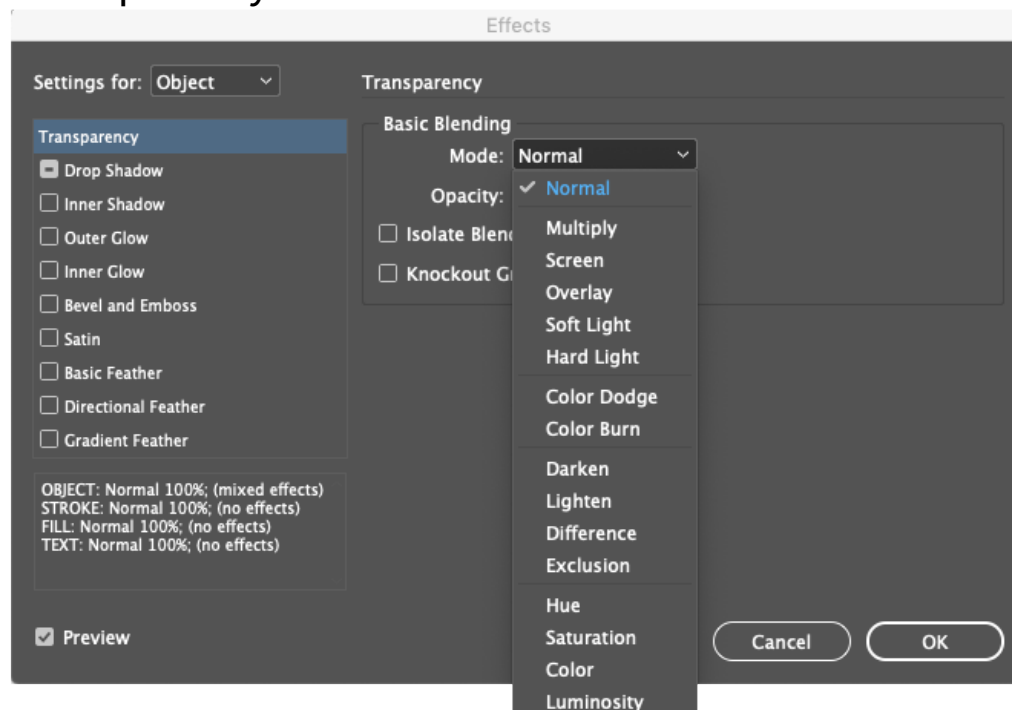
## 2020? (Not released yet)

ISO 15930-9:?: **PDF/X-6**, Page level output intents, Black Point Compensation, Cxf, D-Part metadata. Based on **PDF 2.0\***

*\*PDF 2.0 better defines the process of transparency blending and the hierarchy of transparency blending color space inheritance*

# Transparency – Blend Modes

- Blending mode is a specification for the ways that the colors of objects blend with the colors of underlying objects. Specifying any blending mode other than Normal (or applying opacity to the Normal blending mode) for an object causes it to be considered a source of transparency.





# Transparency – Blend Space

Colors involved in transparency **may be transformed** during the flattening/rendering processes. If the application's color settings are not configured correctly,.

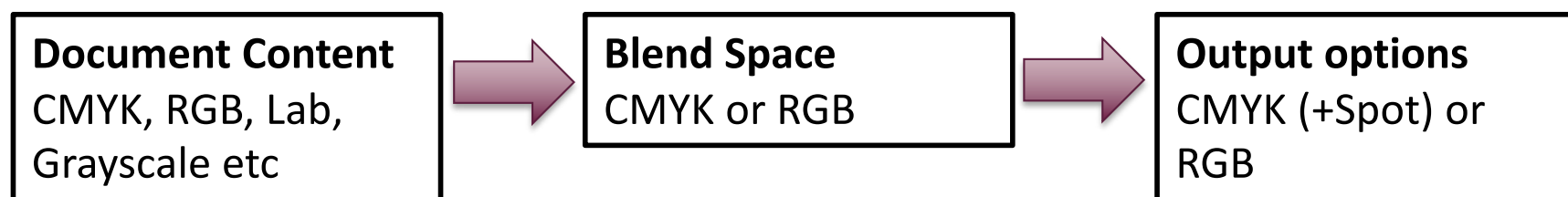
## Transparency Blend Space

A blend space is needed because a document may consist of a **mix of RGB, CMYK, or Lab colors** on the same page, all of which can be blended together via transparency effects.

- In order to blend transparent objects together, the Flattener must **use a single color space (RGB or CMYK)** in which to perform the blending. This space is referred to as the **Transparency Blend Space** (or simply, “blend space”).

## Recommendations

- The GWG recommends that all imported and embedded files use the **same transparency blend space** as the destination file. Similarly, the GWG recommends that all objects within the same file have the same transparency blend space, which must be set to be either undefined or DeviceCMYK. This is the requirement for **the GWG 2015** and later specifications, and the corresponding preflight profiles will check PDF files against these attributes.
- Caution when using ICC based blend spaces in isolated transparency groups since their processing is not clearly defined in PDF 1.6 (base of PDF/X-4). This is resolved in PDF 2.0.



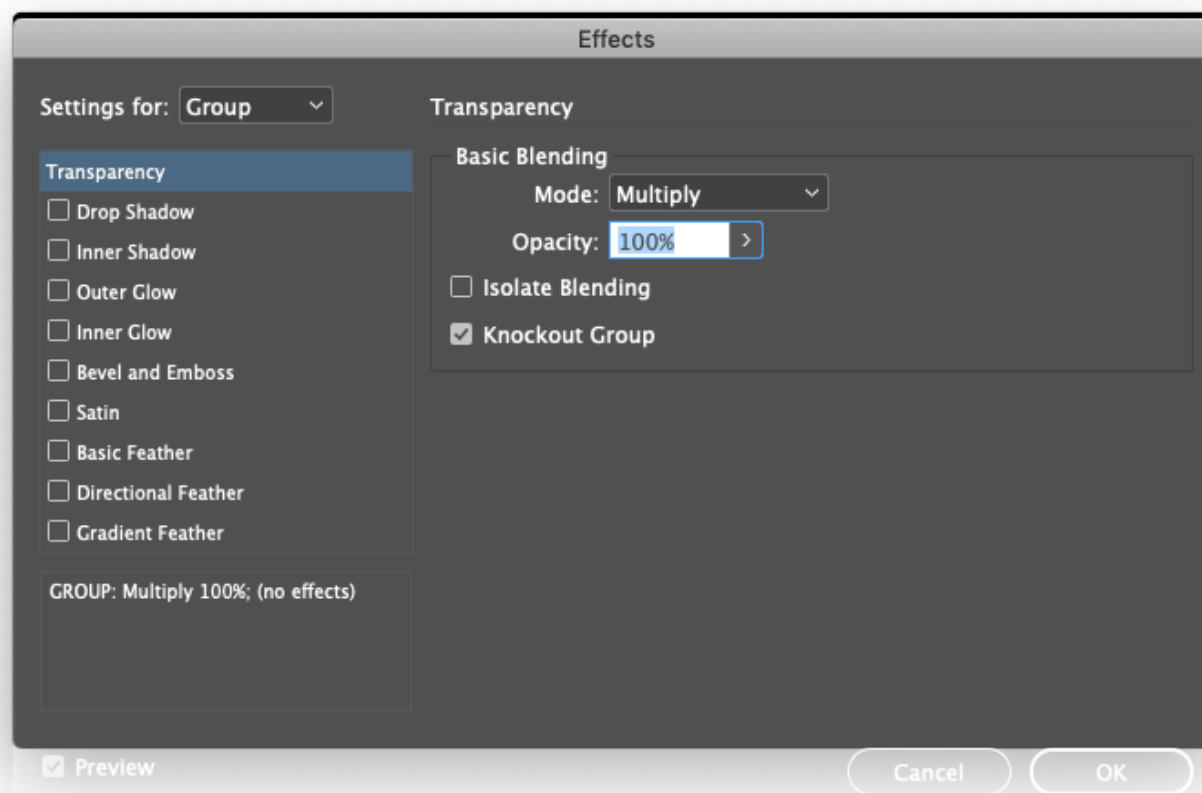


# Transparency – Knockout and Isolated

- These are options for working with groups of objects and altering the way that objects interact with each other when using transparency. Either within the group itself or the relationship with other objects on the page.
- These options are documented and have options in desktop applications so designers can achieve the results they are looking for when working with transparency
- There are four possibilities
  - Both off
  - Both on
  - Knockout on, Isolate off
  - Isolate on, Knockout off.

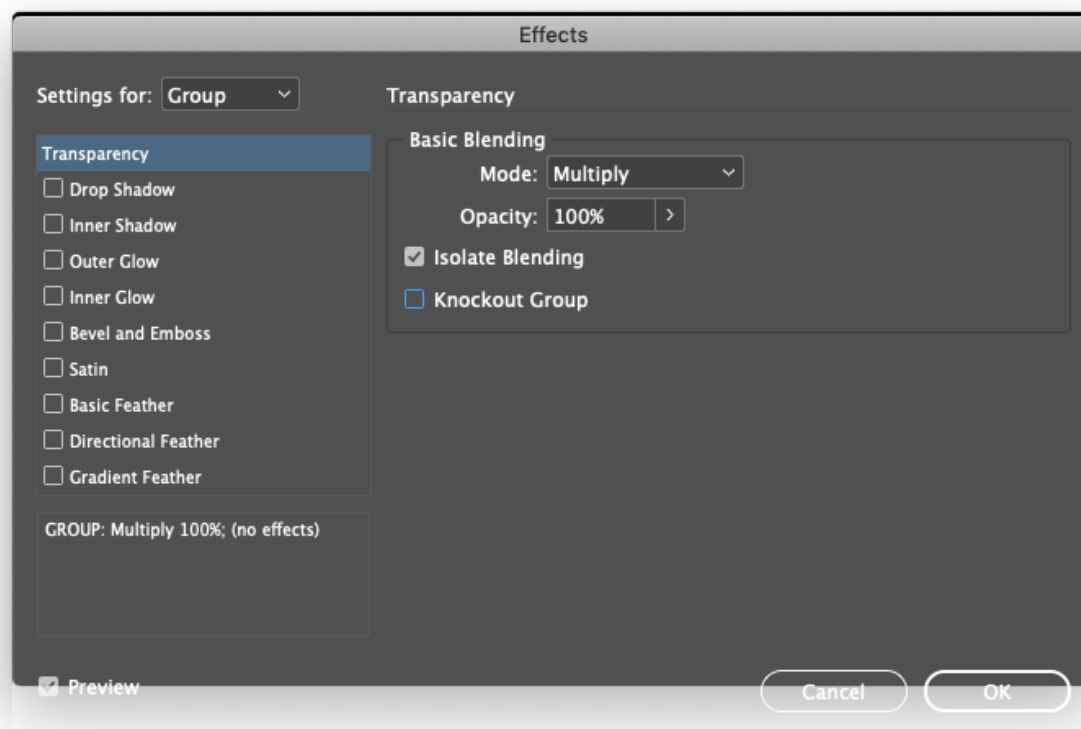
# Transparency – Knockout Groups

- The “knockout” property of a transparency group applies to all the objects inside the group interacting with each other
- If a transparency group has “knockout” enabled then all the objects inside it knock each other out, regardless of their own knockout or overprint setting.



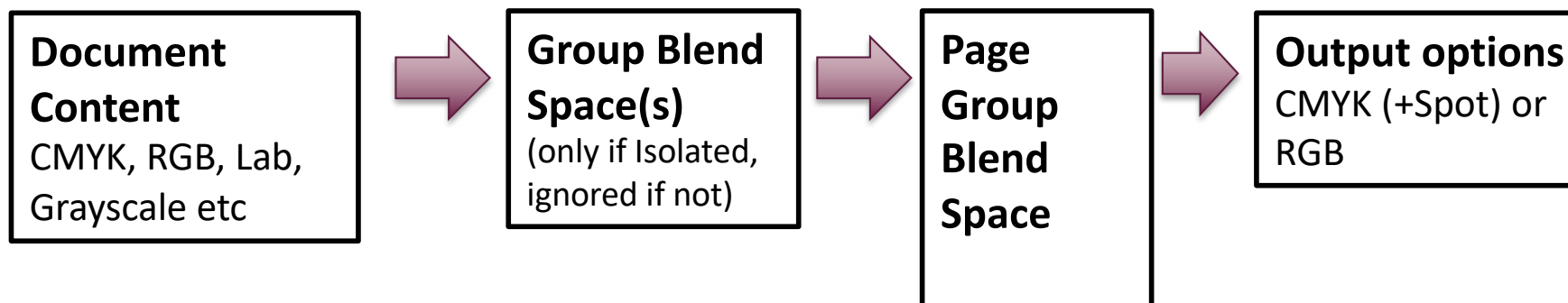
# Transparency – Isolated Group

- If a transparency group is “isolated” then the individual objects inside the group have no interaction with the objects underneath that are outside of the group.
- In practice, this means that things like overprint and blend modes can’t leave the group and effect the objects underneath the group.
- How the group itself can have a blend mode or attributes that cause it to interact with underlying elements, and that applies to the elements. (see below, the group has a ‘Multiply’ Blend Mode)



# Transparency - Page Group

- The main reason to have a page group is to have a blend colour space. The blending colour space of a group says “every object on that page shall be rendered to the blend colour space of the page group. The result will then be converted to the colour space defined by the output intent
- When the blend colour space is undefined or DeviceCMYK, it gets inherited from the output intent, so no color space conversion takes place (except if you have an ICC based RGB print elements on the page)
- This also means if the blend colour space of the page group is ICC based, everything on the page, also DeviceCMYK is converted using ICC profiles. Hence: no longer pure K only. Acrobat currently does show such a text K only, but e.g. APPE separates K only to a rich CMYK.





Examples...

# Flattening vs Rendering

## Transparency Flattening in application

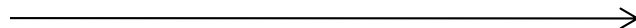


Preserving visual appearance

Text  
Graphics  
Images  
Masks  
Softmasks  
Layers  
Spot Colors  
Overprint

Flattened at the resolutions set in the Flattener configuration

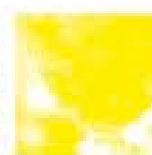
## Rendering (Ripping)



CYAN



MAGENTA



YELLOW



BLACK

Rendered directly to separations files at the resolution of the output device (eg 2540 ppi)

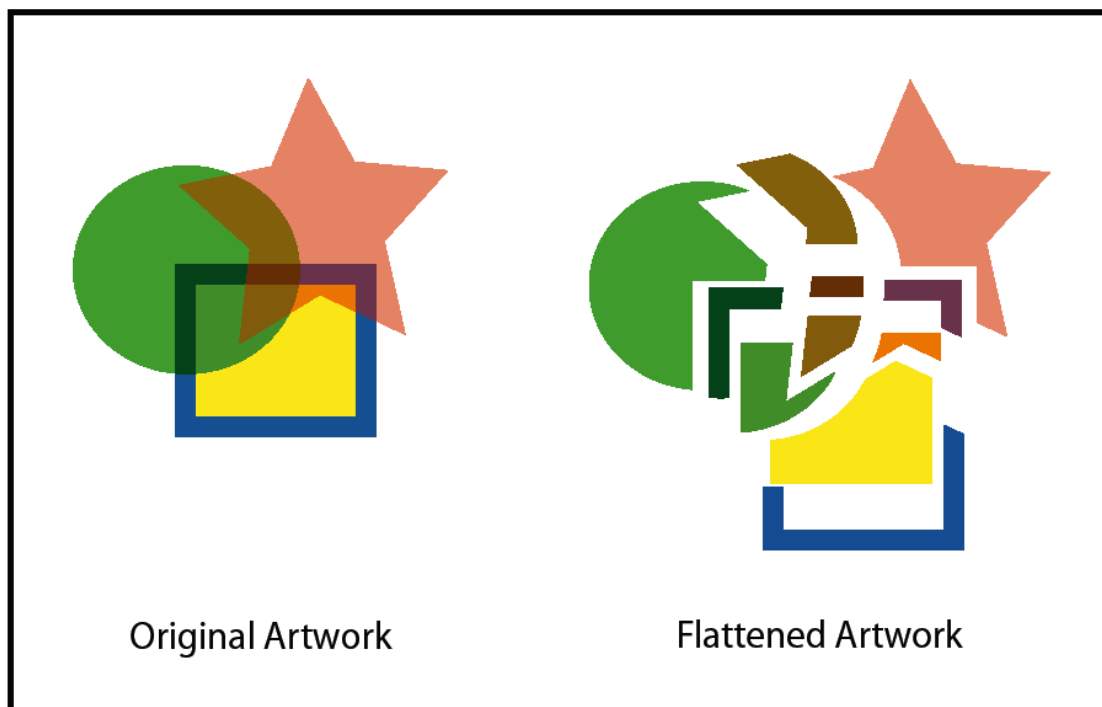
# Flattening – How and What

- The process of flattening converts all the overlapping elements in a stack of transparent objects into a format that captures the look of the original transparency for printing.
- To achieve this, an application's flattener software examines the interactions at every point of the transparency and does four things to the artwork:
  - It cuts the transparent art apart and represents overlapping transparent regions by individual, abutting elements, each with its own color.
  - It retains the integrity of the original transparent objects as much as possible (e.g., type stays type, vectors stay vectors), but it may rasterize some type or artwork when necessary, based on the file's complexity and the flattener settings in effect at the time. It sets the resolution of rasterized areas to a specific, device-dependent value that is defined by the flattener settings in effect at the time.
  - If overprinting is also used in the file, the flattener, by default, may process the overprinting objects as it would process overlapping transparent objects.



# A Simple Example of Flattening

- Flattening cuts transparent art apart to represent overlapping areas as individual pieces that are either vector objects or rasterized areas. This example involves only vector objects. As artwork becomes more complex (mixing images, vectors, type, spot colors, overprinting, etc.) so does the flattening and its results.

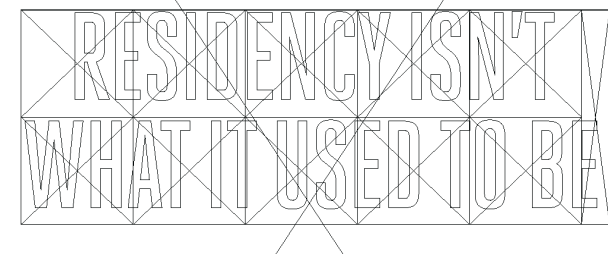


# Flattening - What

- An object that has a transparency effect applied to it is called a **source of transparency**.
- Objects that are a **source of transparency** or interact with transparency are processed by the **Transparency Flattener**, possibly resulting in changes to their composition in the output.
- An object is a source of transparency if any of the following applies:
  - It has an opacity of less than 100%.
  - It has any blending mode other than Normal.
  - It has an opacity mask.
  - It has a drop shadow or feather.
  - It has an inner glow or outer glow effect .
  - Its fill or stroke has a style, brush, pattern, or filter effect that has any of the previous properties.
  - It is a placed image (Photoshop) file (native, PDF, or TIFF) with a transparent background.
  - It is a placed graphic (Illustrator) file (native or PDF) that contains one or more objects with any of the previous properties.
- An object interacts with transparency if:
  - It is a source of transparency.
  - It is overlapped by a source of transparency.
  - It is very close to (usually within one point) a source of transparency and beneath it in stacking order (including objects on other layers).

# Flattening – Atomic Regions

- To achieve the visual effect of transparency with the use of opaque objects, the flattening technology examines the interactions at every point of the transparency and does several things to the objects involved:
- The Flattener cuts the original transparent objects apart and replaces overlapping transparent regions with a set of objects called atomic regions. Each atomic region stands on its own and does not rely on underlying or overlapping objects for its final appearance.
- The stitch between atomic zones can sometimes show up on-screen as **thin white lines**. To reduce or eliminate these within Adobe Acrobat, turn off smoothing (anti-aliasing) in Acrobat (Acrobat > Preferences > Smoothing)



# Flattening – Overprint

- If overprinting is mixed with transparency flattening can cause overprinting to be preprocessed in areas where both overprinting and transparency are applied.
- The following list contains conditions under which the Flattener preprocesses overprinting instructions.
  - Overprinting objects have transparency directly applied to them (for example, they are less than 100% opaque).
  - Overprinting objects are part of a group to which transparency is applied.
  - Overprinting objects overlap (that is, sit underneath) and are within approximately one point of objects or groups that are transparent.
  - Overprinting objects are in a placed file to which you apply transparency.
  - Overprinting objects are part of a complex region that the Flattener must rasterize.
- If an overprinted object is involved in transparency, overprint is flattened (i.e. the overprinted object is divided into atomic regions and their color is flattened, taking overprint into account). Flattening of overprinting maintains the visual appearance of the objects involved, and it separates correctly.
- In other scenarios, overprint instructions can be generated as a result of flattening, even if no overprint is set manually. This can happen when spot colors that are involved in transparency are flattened.
- **Never use a RIP's “discard overprint” option when dealing with transparency.**

# Flattening – Spot Colors

- In some cases, when spot colors are involved in transparency, flattening relies on overprinting to render the proper result.
- Some blend modes cannot be applied to spot colors, in which case "Normal" is implicitly used instead



# Flattening – Fonts

- **Font conversion during flattening**

- If text is involved in transparency, the Flattener often needs to rasterize or outline some of the characters in the text.
- Because the Flattener only flattens text in areas affected by transparency, it's possible that some characters will be flattened while others remain unaffected.

- **Recommendation**

- Wherever possible place text and line art elements above all nearby sources of transparency in the object stack to minimize the possibility that the Flattener will process them

# Live Transparency - Benefits

- Higher quality
- Transparency effects are directly rendered to output device resolution (eg. 2540 ppi)
- No object clipping
- No image clipping
- Ability to edit is preserved
- No unnecessary object conversion (outlined text)
- Allows color managed PDFs
  - objects can keep their original color space since the file is not flattened to the blending color space
- Keep spot colors definitions till the very end
- Ability to search is preserved
- No flattening errors
- No viewing issues
  - no anti-alias effects when viewing (thin white lines)
  - Acrobat (Reader) does not rely on overprint simulation
- Faster PDF export
- Smaller files

Examples...

# Preflight of transparency

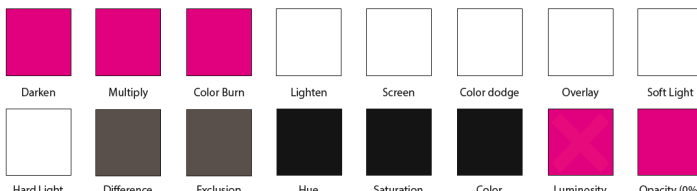
- **Ensure your current Preflight routine includes the relevant checks to ensure Transparency is properly configured**
- **GWG 1v4 Specification 2008 (based on PDF/X1a)**
- Live transparency not allowed and set to error
- **GWG 2012 and 2015 Specifications )based on PDF/4)**
  - Preflight Specification Checks
    - Check that Transparency Blend Space is CMYK
    - Check that Output Intent is CMYK
      - 2012 Specification defines specific ICC Profiles per Preflight variant
      - 2015 Specification just requires they are CMYK



# Best Practices

- **Check that your workflow and output devices are configured correctly.**  
The Free Ghent Output Suite 5.0 can be of particular benefit here to test your production systems configuration and capabilities. You should check all your applications that touch or rewrite a PDF in your workflow, but it is not necessary to preflight the Output Suite, that could potentially break it.
- Take particular care with :
  - Imposition software
  - Tiling/nesting software
  - Ganging software
  - Color servers
  - Ink saving software
  - Devicelink conversions

**GWG 16.4 - Transparency Basic Blend Modes (ICCBasedCMYK)**



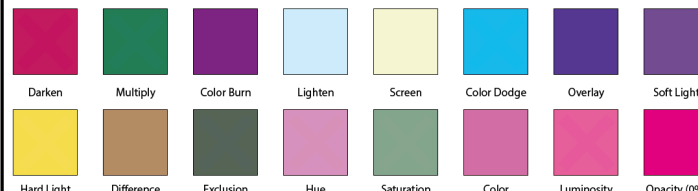
If an 'X' appears, rendering of Non-knockout Transparency Groups (a transparency effect) is not performed correctly.

PDF/X Output Intent	ISO Coated v2 300% (ECI)
Page Level TBCS*	Non Knockout (Blend Mode Normal), TBCS*: DeviceCMYK
Upper (object): Type, TBCS*	ICCBased CMYK (FOGRA39), using defined Blend Mode
Lower (object): Type, TBCS*	DeviceCMYK

\* TBCS = Transparency Blending Color Space

15 Oct 2015 © Ghent Workgroup, www.gwg.org PDF/X-4-ICC 16.4

**GWG 16.1 - Transparency Basic Blend Modes (ICCbasedRGB)**



A faint X is due to differences in the CMY and does not indicate a failure.

A clearly visible X indicates that this blend mode is not supported properly which is a failure.

PDF/X output intent	ISO coated v2 300% (ECI)
Page group blending color space	DeviceCMYK
Upper object	ICCbasedRGB (sRGB)
Lower object	ICCbasedRGB (sRGB)
Rendering intent	Saturation
All group color spaces	DeviceCMYK
All groups	Non isolated, non knockout

14 July 2016 © Ghent Workgroup, www.gwg.org PDF/X-4-ICC 16.1

# Thank You!

For more info contact  
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