Qartis S.A.

TECHNICAL SPECIFICATION FOR PREPARATION OF PRODUCTION FILES FOR PLASTIC CARDS PRINTING

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„Technical specification for preparation of production files for plastic cards printing”

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Dimensions & placement

all graphic files for trims are available
for download on our website
https://www.qartis.pl/en/products/templates/

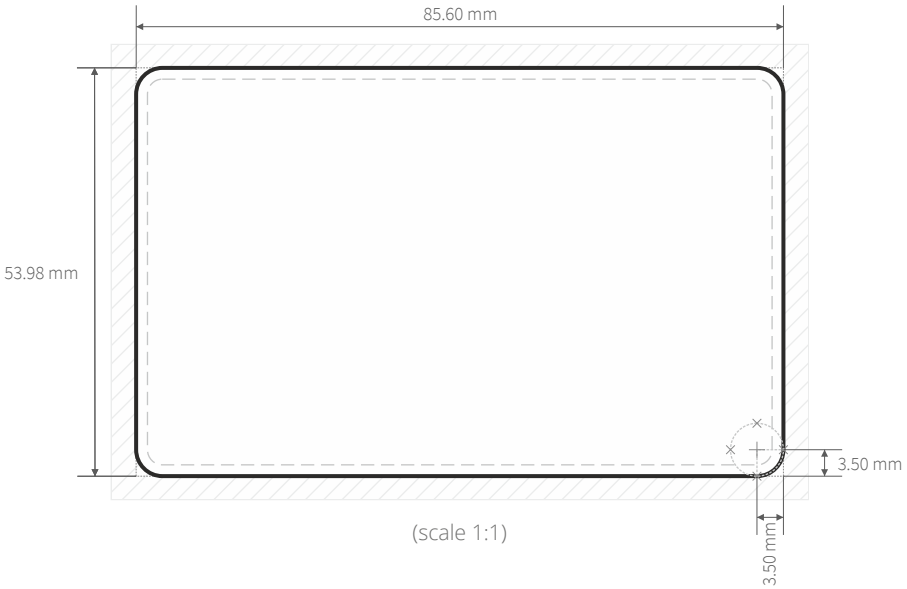
1.1 Cards types

1.1.1 CR80

Dimensions table

Trim		Artwork		Radius	Bleed
width	height	width	height		
85.60 [mm]	53.98 [mm]	91.60 [mm]	59.98 [mm]	~3.50 [mm]	3.0 [mm]

Diagram



Notes

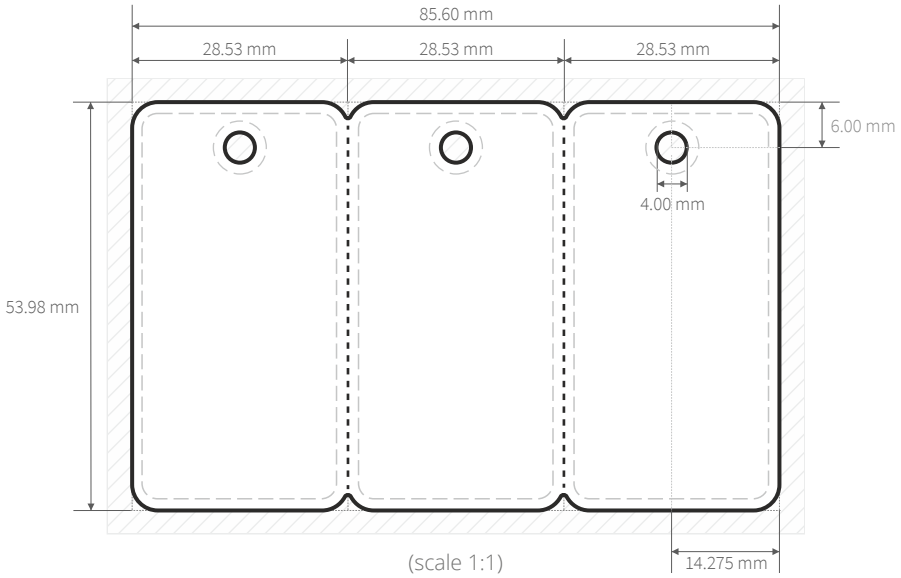
Please note that CR80 format is extensively used as a base for other trim types throughout this specification. Whenever “CR80” exists in the trim type name, it means that dimensions and radiuses of the media correspond to some extent with CR80 standard.

1.1.2 3KEY

Dimensions table

Trim		Artwork		Key width	Radius	Bleed
width	height	width	height			
85.60 [mm]	53.98 [mm]	91.60 [mm]	59.98 [mm]	~28.53 [mm]	~3.50 [mm]	3.0 [mm]

Diagram



Notes

For 3KEY punch, it is advised to use:

- solid color fill background,
- repeatable / pattern background,
- gradient passages between segments,

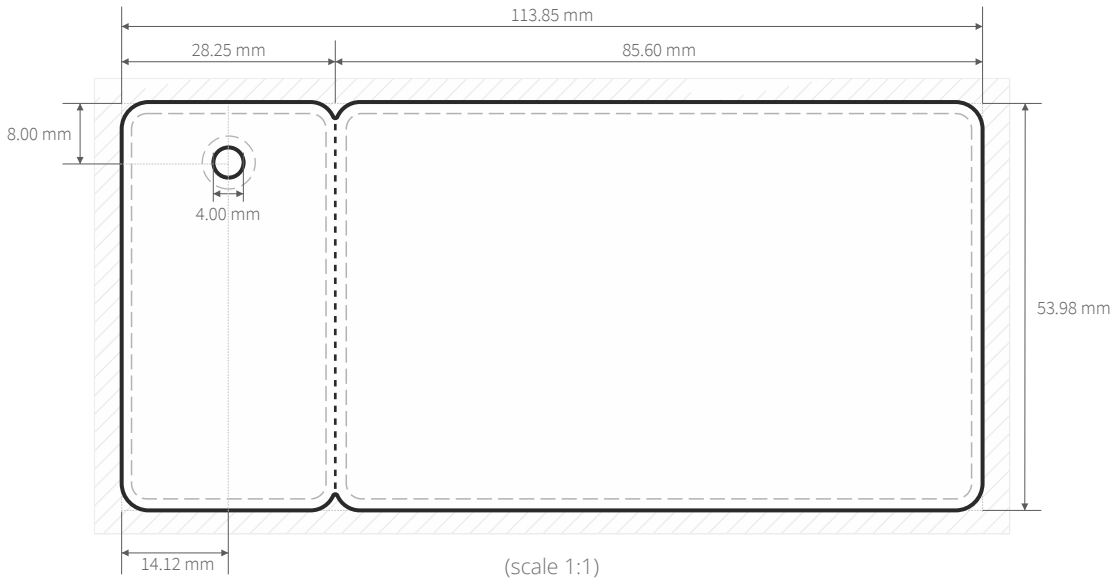
due to allowed punch precision margins (see Chapter 2 *„Requirements”*, section 2.2.4 *„Preparing background for FOB keys”*).

1.1.3 CR80 + key

Dimensions table

Trim		Artwork		Key width	Radius	Bleed
width	height	width	height			
113.85 [mm]	53.98 [mm]	119.85 [mm]	59.98 [mm]	~28.25 [mm]	~3.50 [mm]	3.0 [mm]

Diagram



(scale 1:1)

Notes

For CR80 + key punch, it is advised to use:

- solid color fill background,
- repeatable / pattern background,
- gradient passages between segments,

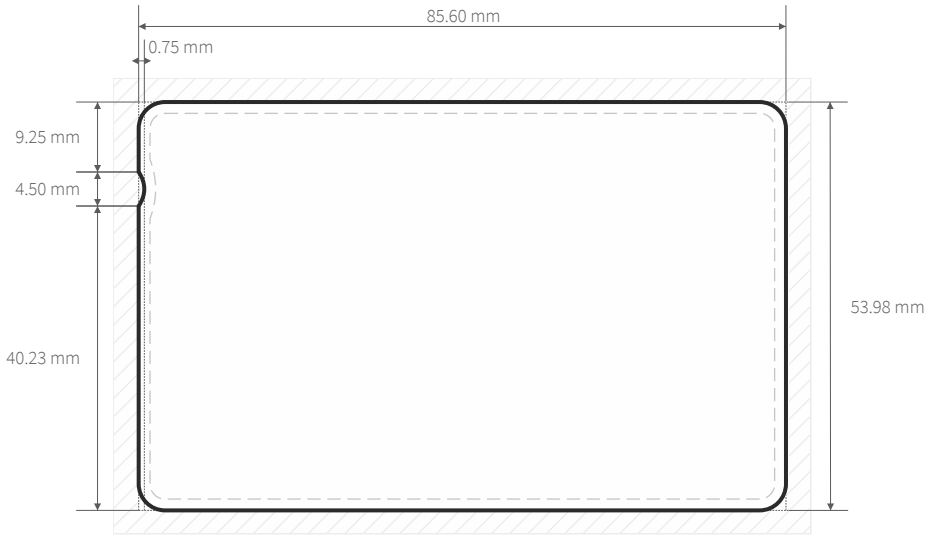
due to allowed punch precision margins (see Chapter 2 *„Requirements”*, section 2.2.4 *„Preparing background for FOB keys”*).

1.1.4 CR80 + notch 1

Dimensions table

Trim		Artwork		Notch		
width	**height**	**width**	**height**	**depth**	**width**	**top margin**
85.6 [mm]	53.98 [mm]	91.60 [mm]	59.98 [mm]	~0.75 [mm]	4.50 [mm]	9.25 [mm]

Diagram



(scale 1:1)

Notes

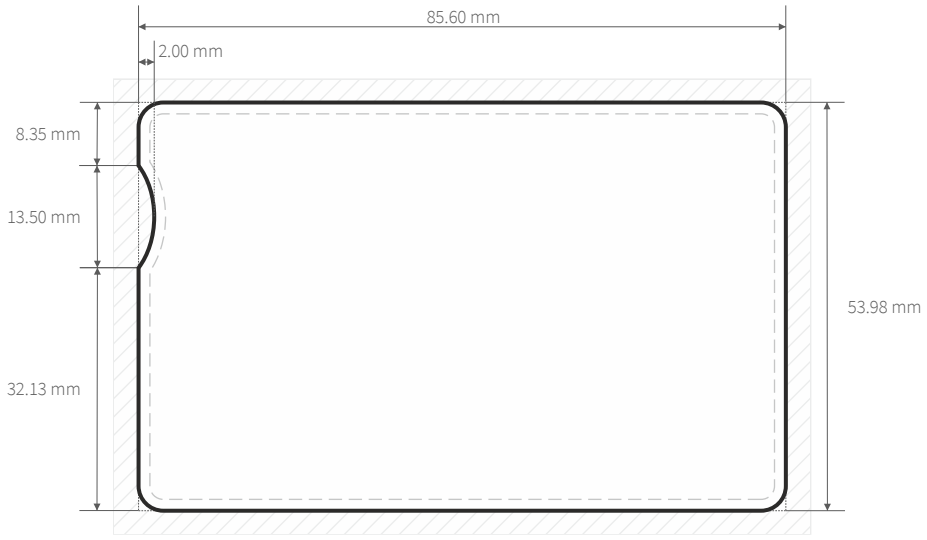
Please note that the notch must not be cutting through the magnetic stripe - it always has to be placed on the opposite side of the card. Moreover, remember to adjust your artwork and placement of the notch to the specification of the card reader or other device the card will be used with, taking into the account the direction which the card is being inserted to the device.

1.1.5 CR80 + notch 2

Dimensions table

Trim		Artwork		Notch		
width	**height**	**width**	**height**	**depth**	**width**	**top margin**
85.6 [mm]	53.98 [mm]	91.60 [mm]	59.98 [mm]	~2.00 [mm]	13.50 [mm]	8.35 [mm]

Diagram



(scale 1:1)

Notes

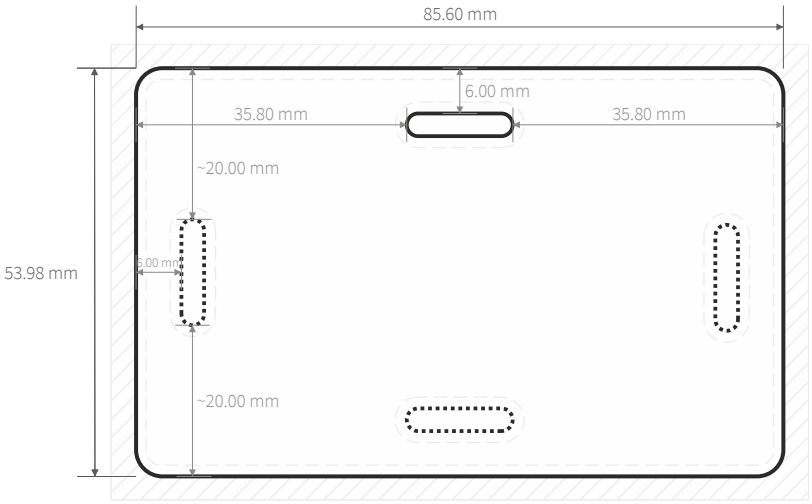
Please note that the notch must not be cutting through the magnetic stripe - it always has to be placed on the opposite side of the card. Moreover, remember to adjust your artwork and placement of the notch to the specification of the card reader or other device the card will be used with, taking into the account the direction which the card is being inserted to the device.

1.1.6 CR80 + „bean”

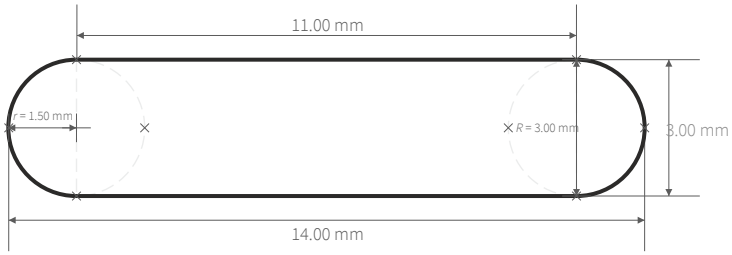
Dimensions table

Trim		Artwork		„Bean”		
width	**height**	**width**	**height**	**width**	**height**	**margin**
85.6 [mm]	53.98 [mm]	91.60 [mm]	59.98 [mm]	14.00 [mm]	3.00 [mm]	6.00 [mm]

Diagram



(scale 1:1)



(scale 6:1)

Notes

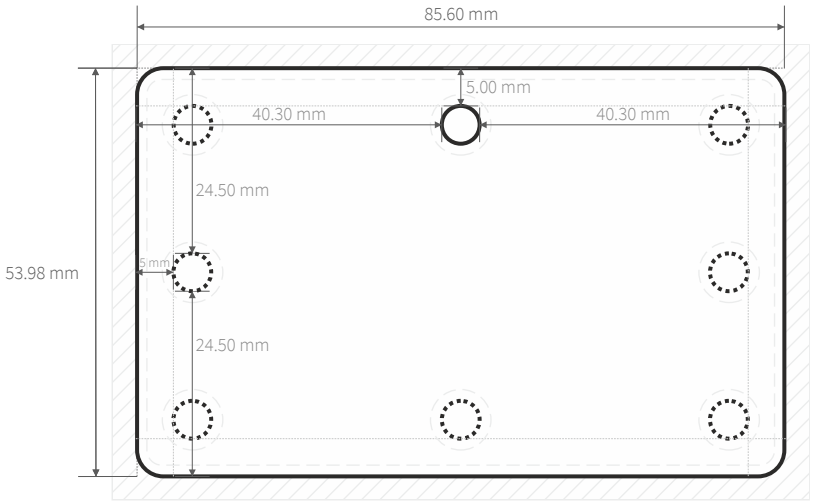
Please note that magnetic stripe cannot be punched through, hence the „bean” must be placed on the opposite side of the card.

1.1.7 CR80 + „fi5”

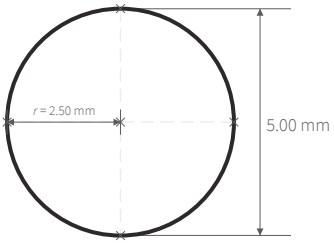
Dimensions table

Trim		Artwork		„fi5”		
width	**height**	**width**	**height**	**width**	**height**	**margin**
85.6 [mm]	53.98 [mm]	91.60 [mm]	59.98 [mm]	5.00 [mm]	5.00 [mm]	5.00 [mm]

Diagram



(scale 1:1)



(scale 6:1)

Notes

Please note that magnetic stripe cannot be punched through, hence the „fi5” must be placed on the opposite side of the card.

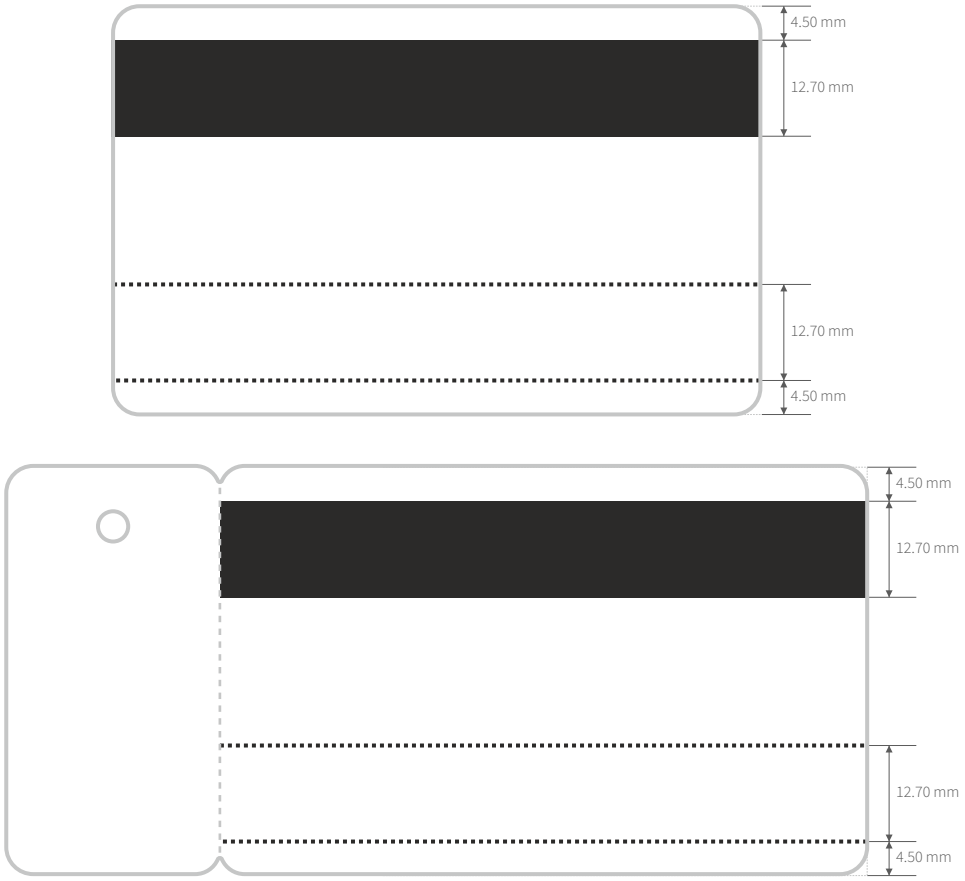
1.2 Magnetic stripes

1.2.1 3-track

Dimensions table

Height	Width	Margin
12.70 [mm]	100%	4.50 [mm]

Diagram



Notes

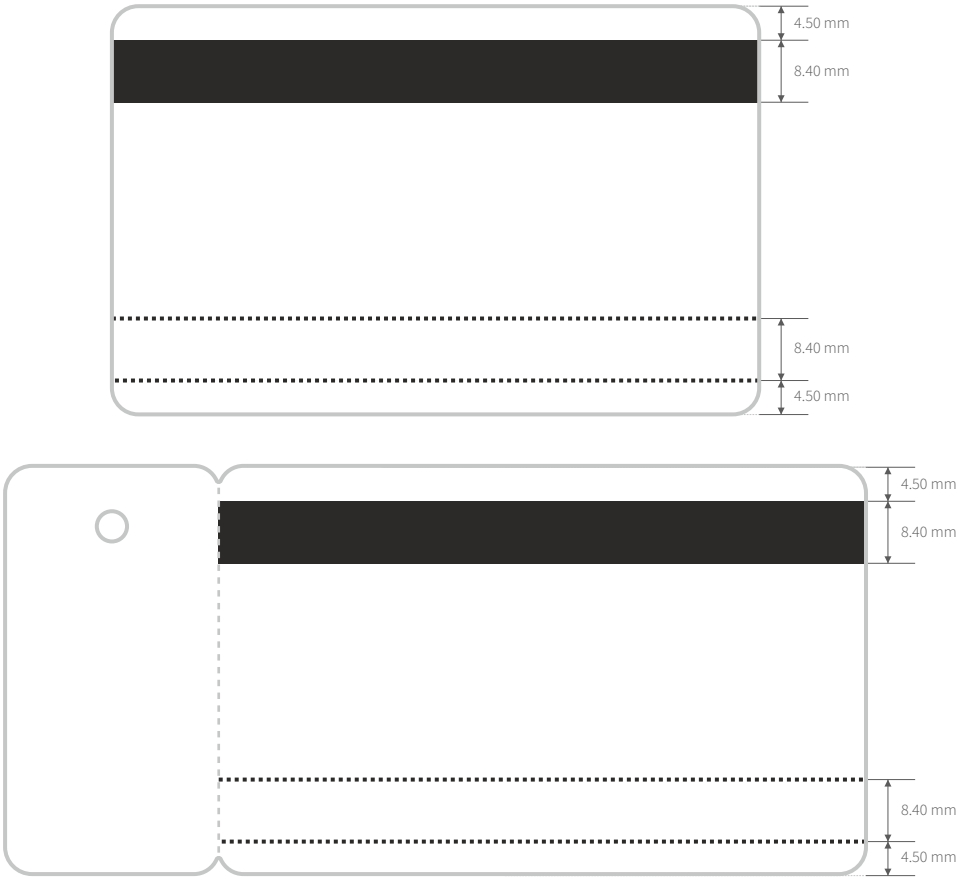
Magnetic stripe simulation should always be described in the file with a spot color fill and have the overprint property turned on. It is forbidden to flatten the magnetic stripe simulation with a background image into a bitmap (unless the final product is meant to have a dummy stripe). Magnetic stripe cannot be punched through by notch or hole.

1.2.2 2-track

Dimensions table

Height	Width	Margin
8.40 [mm]	100%	4.50 [mm]

Diagram



Notes

Magnetic stripe simulation should always be described in the file with a spot color fill and have the overprint property turned on. It is forbidden to flatten the magnetic stripe simulation with a background image into a bitmap (unless the final product is meant to have a dummy stripe). Magnetic stripe cannot be punched through by notch or hole.

Chapter 2

Production file guidelines

2.1 Basic requirements

2.1.1 General

For a file to be used in card production it should be prepared as a CMYK composite (not separated) postscript file, like .PDF (preferred file type for production) in Acrobat PDF 1.4, 1.5 or 1.6 version or alternatively .PS and .EPS.

Due to possible different export outcomes between rendering engines of different versions of the same software, our company does not accept open production files (for example .AI, .INDD, .CDR, etc), hence exporting to postscript form is mandatory. However, such files can be required by the company in special circumstances.

2.1.2 Page layout principles

Each side of the design must be placed and prepared on separate pages or in separate files. The artwork should always be centered horizontally- and vertically-wise in relation to the document dimensions (see section 2.2.3) with trim marks present in the layout (not necessary if the trim-boxes are set properly). The project must be prepared accordingly with the set dimensions, in 1:1 scale (see chapter 1 *„Dimensions & placement"*, sections 1.1.1 — 1.1.7 for further reference on card shapes and dimensions). All punch shapes are availalble at our website https://www.qartis.pl/en/products/templates/.

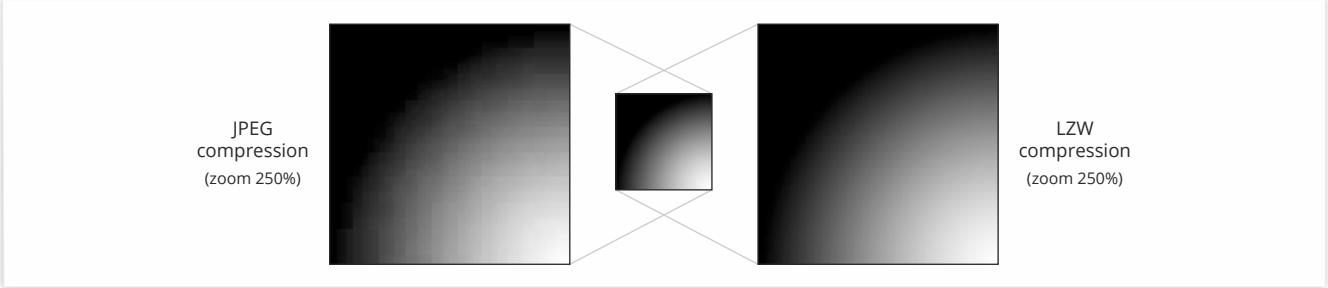
2.1.3 Colors & objects

Color values of bitmaps and vector objects must be prepared in CMYK palette and/or spot colors. It is generally not advised to use Grayscale due to possible uncontrollable conversions to 4-valued CMYK. Suggested total ink coverage should not exceed 320%.

ICC profiles should not be embedded in the document - even if their presence would be noted, they will be removed during initial prepress processes. Please use ICC profiles for simulation or conversion only and not in the production file itself (suggested simulation and proofing profile: ISO Coated v2 / FOGRA Coated 39L).

Bitmap objects should be optimally prepared in 300 PPI resolution, using LZW, ZIP or JPEG 2000 compression type. Standard JPEG compression is acceptable, yet the quality may be lower due to lossy compression algorithm and visual artifacts may become visible in the final product (see Picture 1).

Also, please refrain from using interactive form elements in the production file.



Picture 1 Comparison between JPEG and LZW compressions output. Notice the blocks on JPEG compression (zoom in if necessary).

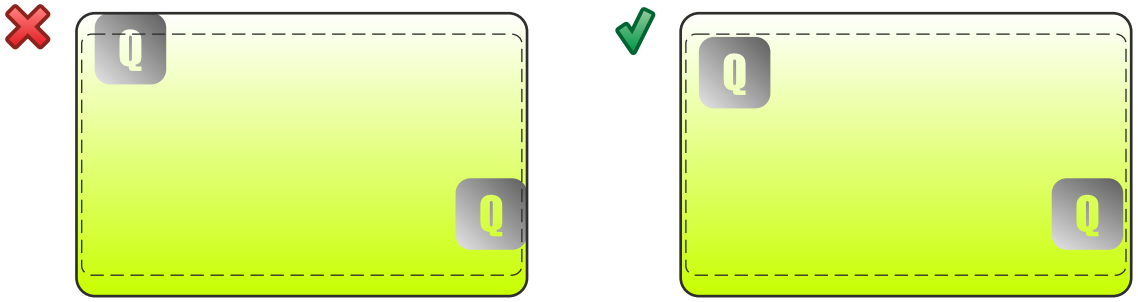
2.1.4 Additional elements

Project elements like hotstamp, personalization placeholders (including randomized bar codes), signature panel fields, magnetic stripes, punch shapes, etc. must be marked in the destined places using a spot color with fill and stroke overprint property turned on.

Additional objects like those specified above should always be prepared in form of a vector object. If it is not possible to prepare them as vector objects, please include them in separate files or pages as a bitmap - they will still need to be verified by our DTP studio.

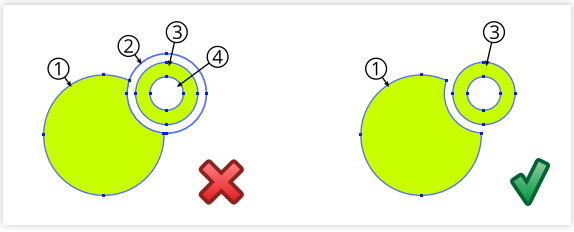
Hotstamp

In case of positioning, hotstamp has to be placed at least 1.00 [mm] from the short side of the card and 4.00 [mm] from the long side.



Moreover, hotstamp object has to be prepared in vector form as a compound path, meaning it cannot be anyhow masked or covered/layer (for example, with background color), but has to be trimmed to final shape and size.

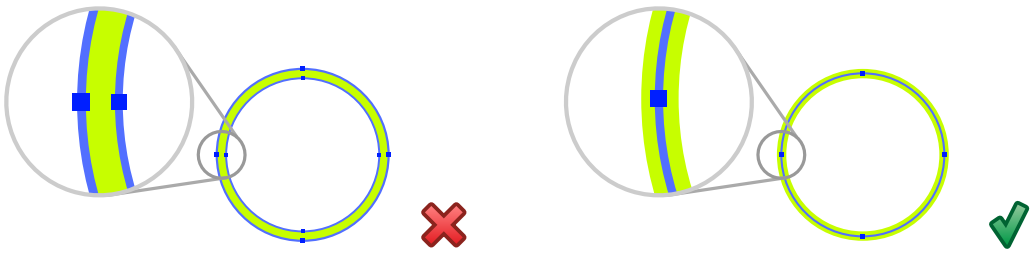
It is advised to create just once compound path, however a separate group will not be considered erroneous as long as their shapes do not intersect.



Picture 2 On the left you see 4 objects (layer order bottom-to-top by number), where 1 & 3 are filled with hotstamp color and 2 & 4 are filled with white color. This is not correct. For this shape to be used, object 2 must be subtracted from 1, and 4 from 3.

Trim

Trim shapes must be prepared as vector objects without fill but with stroke - the stroke can not be expanded to a compound path with fill. Moreover, please pay attention to how the stroke is being attributed - stroke must be rendered in the middle of object shape (not inside or outside of it).



2.1.5 Overprint

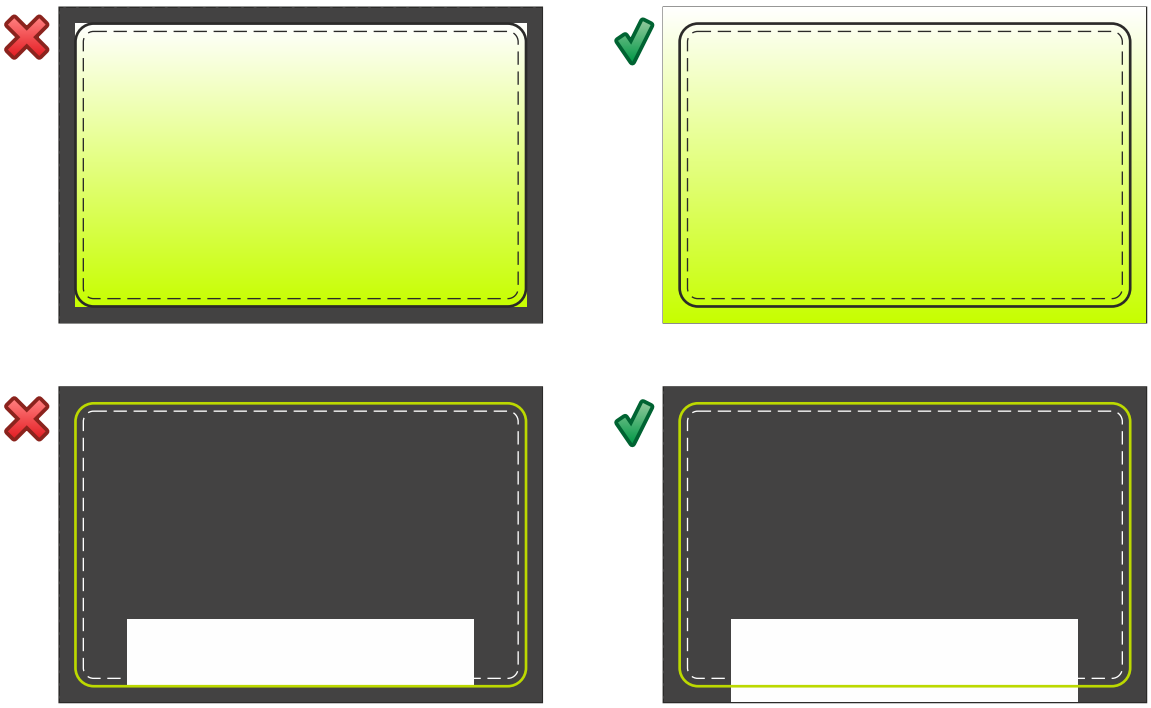
In our process all overprint properties are being set from the production files. It means that every overprint property is based on properties set during the design phase of the project. This however may be changed, if the actual property is in contradiction to the sample card or because of the production process problematics, for example: very small text objects that could become unreadable due to lack of overprint.

For more information about overprinting and how to correctly set it, see chapter 3 *"Recommendations"*, section 3.2.1 *„Overprint application"*.

2.2 Artwork layout requirements

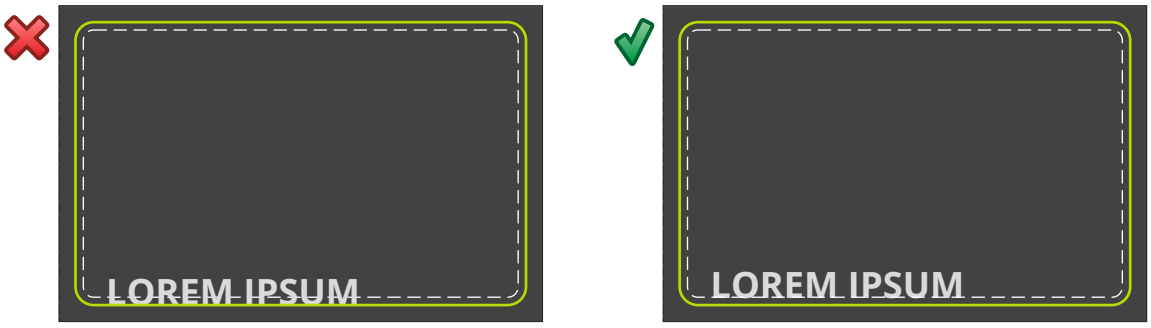
2.2.1 Bleed application

Backgrounds (images and fills) and graphic elements placed in the immediate vicinity of trim lines must be extended over the bleed area to secure the final product from punch slipping errors.



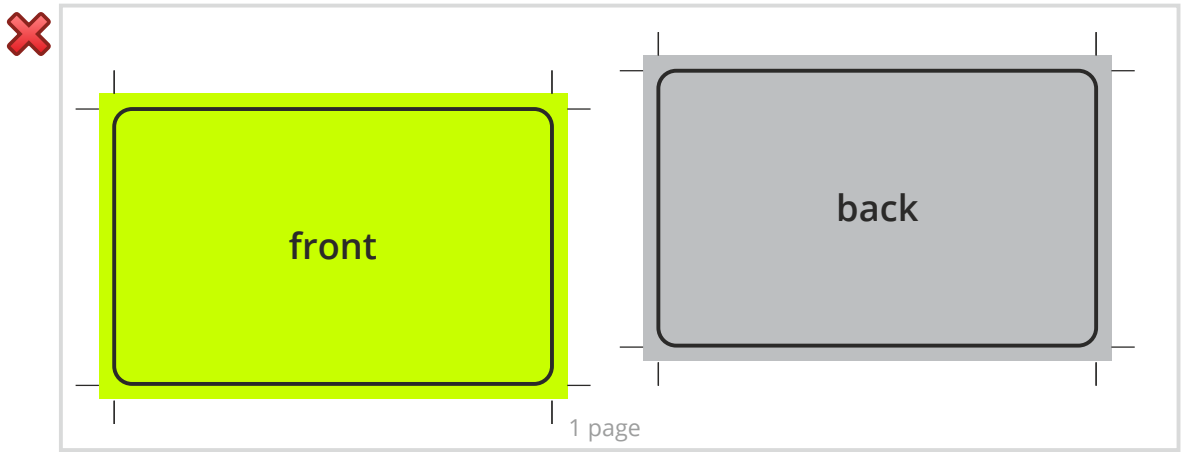
2.2.2 Content placement

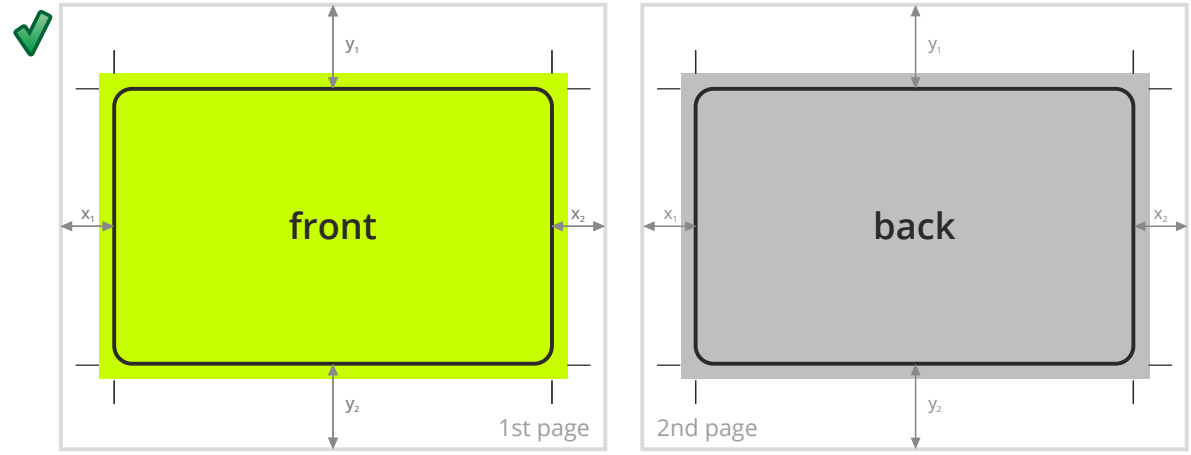
Text paragraphs and other forms of content can not be placed adherently to trim lines. It is recommended to place those objects at least 1.50 mm away from the border.



2.2.3 Single side per document page

It is required to place each side of the card onto separate pages or in separate files. Also, please remember about proper content centering or properly describing TrimBox coordinates.

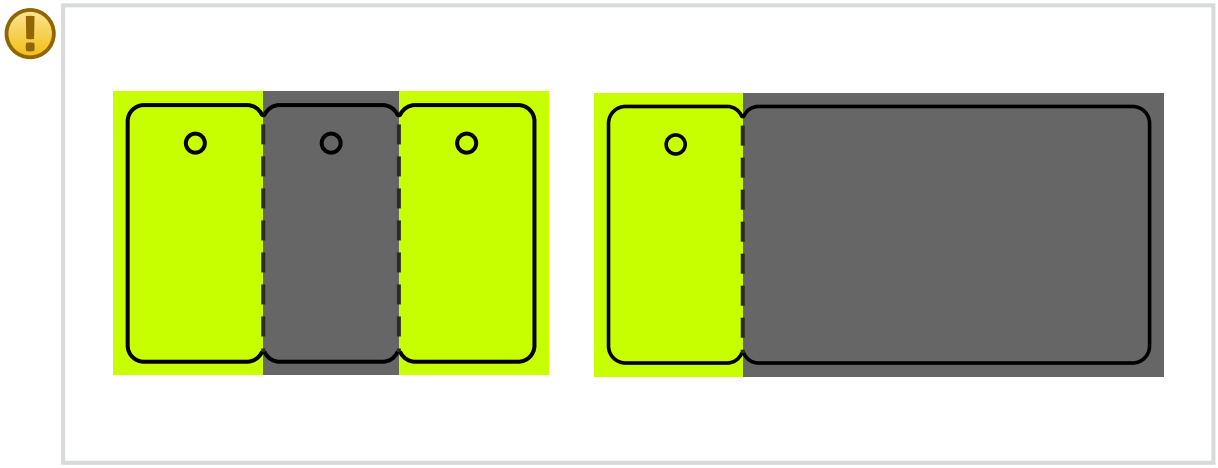


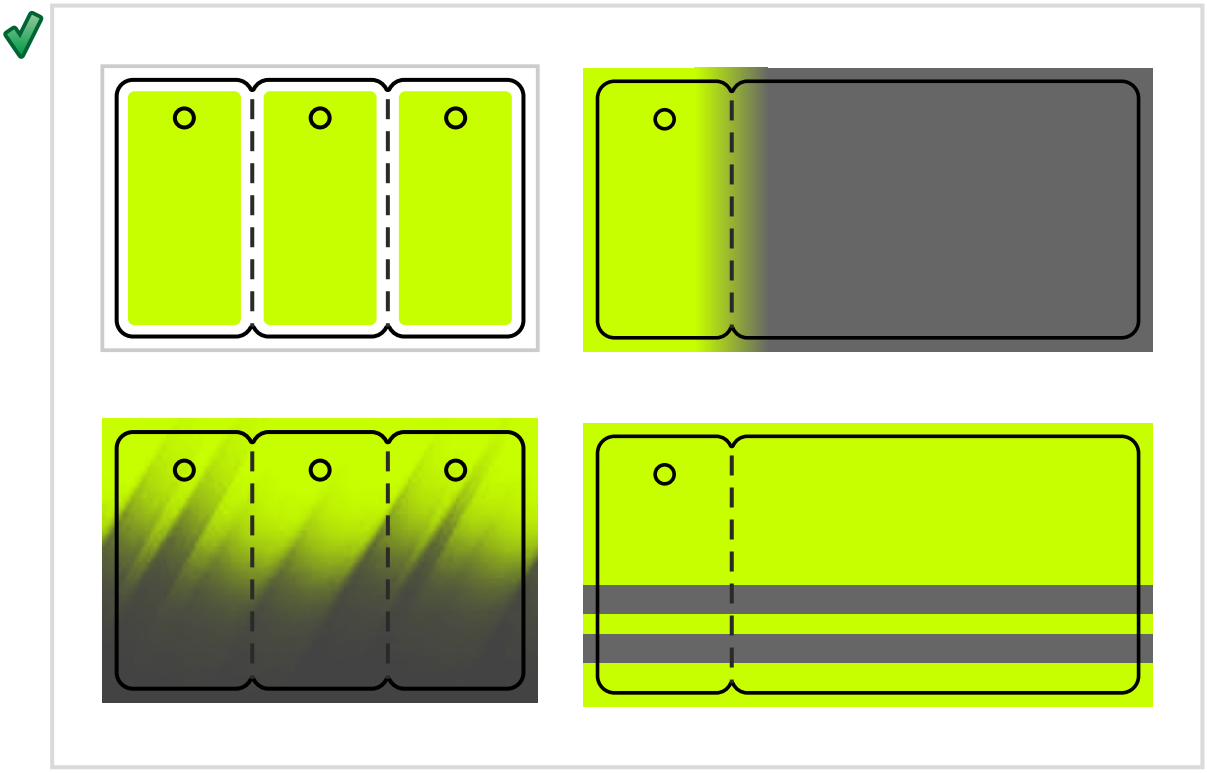


$x_1 = x_2 \qquad y_1 = y_2$

2.2.4 Preparing background for FOB keys

We recommend using solid fills or properly cropped images for backgrounds of FOB keys. Using sharp cut-offs is not recommended due to allowed punch margins - it means that parts of backgrounds can be placed on adjacent key segment.





2.3 Preparing files for non-white plastic

2.3.1 Synopsis

If it is required of the card to have a border side of certain color, it is possible to achieve so by printing on colored plastic.

Aside from the standard solid white or colored plastic sheets, it is also possible to print on transparent plastic. Printing on see-through medium gives us additional possibilities. For example: because our plastic cards consist of two merged sheets, it is possible to print between them, allowing to create „depth" effect with maximum of 3 levels being achievable (see Picture 3).

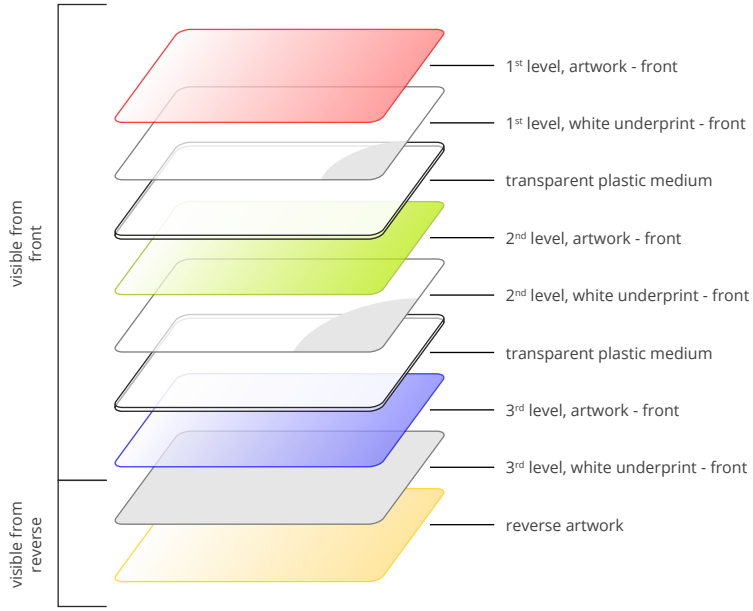
2.3.2 Staging

The principles of printing on custom sheets are the same as with standard white sheets, however they do have additional requirements depending on the type of plastic.

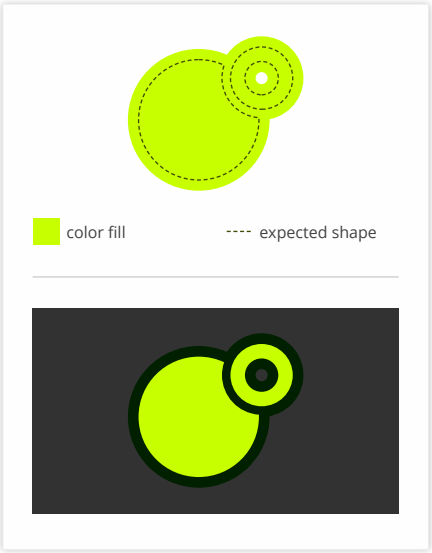
As for transparent plastic, first and foremost, remember that if two sides of the card are meant to match a certain shape, the sides artworks backgrounds have to be horizontally flipped in comparisson.

Also, it is important to take into account, that offset inks coverage is not opaque, meaning that if the colors are meant to be solid then a white underprint has to be applied in specified places. Such underprint is basically a shape which you plan not to be transparent or tinted by the plastic color. It has to be prepared as a vector object.

In situation where you are printing on a very dark or black plastic, it is advised for the colors to slightly bleed outside their shapes (see Picture 4), so the white background will not be visible from underneath.



Picture 3 Layers order for transparent cards of 3 depth levels.



Picture 4 Trapping example for black background.

2.4 Files delivery

2.4.1 Available methods

We accept various methods of production file delivery:

- via e-mail, directly to the specified Account Manager,
- via postal or courier services, in form of CD or DVD, addressed to our headquarters,
- via File Transfer Protocol (FTP), after previously acquiring login credentials consisting of user name and password (ftp address: ftp://77.252.139.249),
- via File Storage services, for example: WeTransfer, GoogleDrive, DropBox, SkyDrive, etc. However, please note that certain File Storage services keep the file available online only for a limited time period. After specified date, the files may not be further available for downloading.

2.4.2 File types

Acceptable file types:

- PDF (preferred),
- PS,
- EPS.

Rejected file types, not fit for production:

- MS Office packet and alternatives files,
- scans and photos of existing cards,
- files using only RGB or indexed color palette (BMP, PNG, GIF, etc.).

Acceptable under certain conditions or by request of the studio:

- open project files(PSD, CDR, AI, INDD, itp.),
- flat composite CMYK files (JPEG, TIFF, etc.).

2.4.3 Naming convention

In case of orders with multiple mutations, please state the mutation name designation in the filename or explain filename-to-mutation correlation in a separate document file.

Also, if the files are corrected after previously sending them to us, please insert additional prefix or suffix containing the amendment serial number in the filename, like for example: „FILEBASENAME_correction1.pdf" or „cor01_FILEBASENAME.pdf", etc.

File names should not have diacritic or accented characters.

Chapter 3

Recommendations

3.1 Software

3.1.1 Software choice

Since the Postscript language, on which most modern printing processes are based, was created by Adobe Systems Incorporated, we would recommend using software from this company, as it is the easiest way of assuring compatibility with the PS standard. It is however not in any way mandatory or preferred by our company as each file has to be exported to Postscript-like form and further validated, no matter how or using which tools it was done with.

That being said, please do have in mind that every piece of software has its specific role and does not necessarily produce an optimal print-compliant document, which also includes software from Adobe. For example, the common misconception is one of Adobe Photoshop features of saving to PDF with sustaining vector layers. What is actually exported is not a vector object with typical properties for this class but a vector-masked bitmap layer, which constitutes a different type of object. Because of that, effective use of object trapping is not possible, hence the quality of print may be lower than initially expected. That is why we recommend using software with native vector objects support, like Illustrator or InDesign, capable of exporting to PDF in accordance to standards.

3.1.2 Using software-specific filters & effects

The vast majority of problems and errors during rastering processes occur because of differences in how objects' properties are being interpreted. Elements like filters (eg. Adobe Illustrator shadows), transparencies (especially gradient passages), blending modes of bitmap images, etc. are very complex in structure on technological level, also the way they are described may vary throughout different versions of used software, and so their correct implementation and planarization in RIP servers is difficult. Using such elements in native mode may lead to processing errors ranging from emergence of visual artifacts, through disappearence of the element, to inability to process the entire production file for futher development.

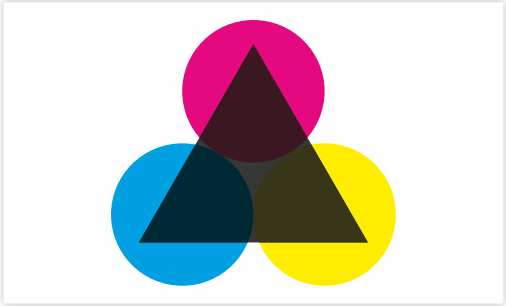
Because of that it is recommended to flatten the objects with aformentioned elements into a single bitmap, merged with the background. It is the best way to secure the visual integrity of the projects, at the same time excluding the possibility of unexpected and occasionaly hard to notice errors.

Also, we advice keeping two separate sorts of files - first being the actual, open-file artwork which can still be edited by a designer, second being a production-ready file, optimized for printing.

3.2 Colors

3.2.1 Overprint application

Understanding and correctly applying overprint property to objects and layers is very often the basis of a well thought through production file. It can be used to ensure proper content readability and presentation.



Picture 5 Black fill overprint simulation for varied colors backgrounds.

While overprinting, it is important to remember that using only black fill overprint on a color-varied background will lead to receiving different shades of black fill (see Picture 5). It is caused by low covering level of the black ink in offset printing. It does not have to be particularly noticeable while the overprinted objects are small or thin, as the contrast build up will simply be too low, causing the color variance to disperse. In other cases (larger objects, thick fonts), it is advised to use a CMYK combination of 4 inks. More on this subject in section 3.2.2 *"Rich black color"* of this chapter.

As much as we prefer overprinting properties to be applied during design phase, in some instances we take liberty to correct its application to suit our production capabilities in order to receive proper quality of the final product.

3.2.2 Rich black color

Because of the low coverage rate of black ink in offset printing, it is advised to use specific methods in order to achieve a deep black shade of prints, if it is required.

One of the methods is using our Rich K color values which are presented in table 1 on the right side of this paragraph. It is based on using CMYK values and is the suggested approach when other CMYK values are also already present in the artwork. Note that Yellow value should be lower than for Cyan and Magenta, which otherwise would become dominant after lamination.

	C	M	Y	K
Simple K	0%	0%	0%	100%
Rich K	80%	80%	60%	100%

Table 1 Simple black and combined/rich black values comparison.

The other method is using multiple run-throughs of black ink. Essentially, in this scenario black inks are being layered one onto another which results in much more consistent black shade. This method is suggested when there are no other colors than black in the artwork.

Please note that these two approaches differ in overall production costs, hence the method should be first consulted with and verified by our company. Also, these methods are best used in situation where black ink is a solid fill and color toning does not occur.

3.3 Objects

3.3.1 Vector or bitmap objects?

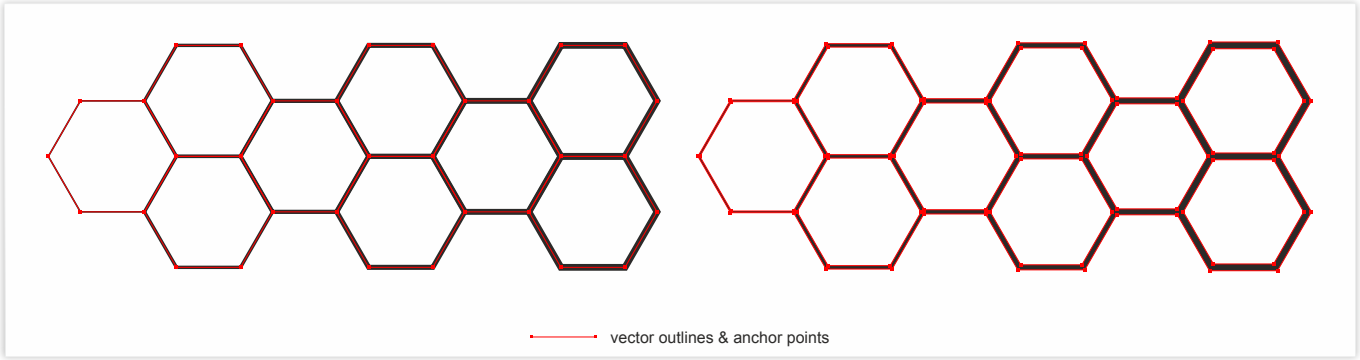
It is important to know how to leverage usage of object types. In some cases it makes more sense or it is simply safer to use a certain type rather than the other. It is generally based on the rule saying that vector objects offer a sharper line of raster edge, while bitmaps tend to use dispersion on the edges. However, while creating or adjusting artwork in Qartis, we prefer to segregate content into two categories: consequential and non-consequential.

The first category consists of product-wise important objects, like logotypes, trademarks, texts and applied security solutions. These contents should always be constructed in form of vector objects and text layers. This way you can secure the shapes of objects, thus increasing their readability. This of course applies only to purely vector-like objects. When it consists of raster image, it is advised to at least apply a vector mask to it.

The second category includes backgrounds and additional fills. In this case you have much more room for interpretation and more decision options. Wether these objects should be a bitmap or vector depends largely on the purpose and nature of the artwork pieces (for example: an actual photograph on most occassions cannot be rationally converted to a form of vector object).

It is important to remember that every distinct object creates a layer that has to be planarized (or, in other words, flattened) during RIP processes. The more layers are created, the longer the time required to process the file, hence overall layers and anchor points count should be optimized. Let's elaborate on how to achieve it.

Example below (see Picture 6) on the left shows nine hectagons with various stroke thickness, which equals nine separate layers according to PDF specification. If we were to multiply it 50 times to, for example, create a background, that would give us 450 layers. To optimize it we would have to expand the objects' strokes and merge them all together to receive just one layer (example on the right). This of course applies to a case in which the objects share the same color properties and the order in which the layers are placed is not intersected by different objects outside of the grouping (after merging objects become one and the same position in layer stack order).



Picture 6 Multi-layered (left) and combine-layered (right) objects. More vector anchor points exist on the combine-layered object, yet it consists of only one layer, making it more optimized for RIP processess to occur.

3.3.2 Thin lines & objects

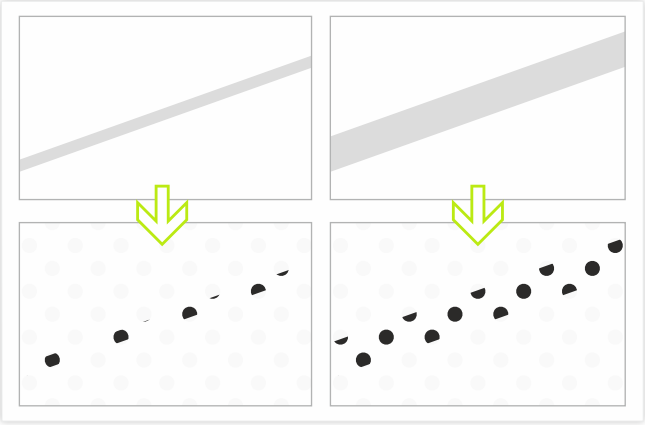
As mentioned before, every file and image due for printing has to go through the process of rastering, in which it is being separated into channels in a form of aligned raster dots, existing in a specified interval between each other which is controlled by image liniature and screening resolution. Because of it, it may happen that very thin lines may look like they are shattered or not fully printed. In Qartis we call it „raster misalignment", which happens while a very thin line runs between the positions of adjacent raster dots, hence it wil not „own", at least partially, a raster dot.

There is no way to fully remove the jaggedness effect of thin lines, however there are ways of minimizing it. We recommend using strokes of at least 0.75 pts (or approximately 0.26 mm) thickness. Of course it applies only to situations where the strokes colors consist of tinted value - objects filled with 100% color value are achievable through printing with 0.10 pts width.

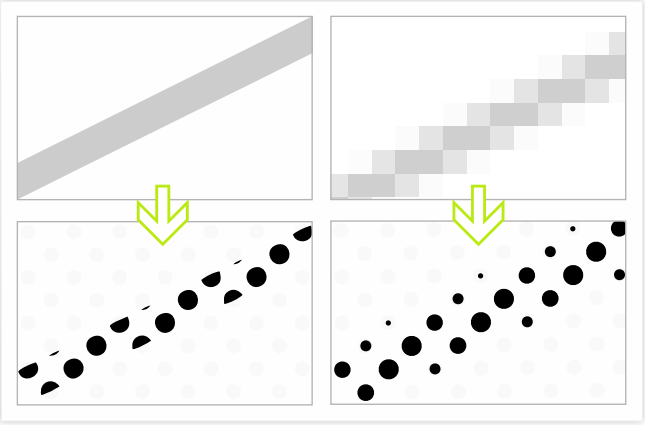
Another solution is adding more than one color to the stroke description. For example, instead of using just black tint, use a full CMYK solution that would imitate the specified gray color. This way lack of black raster dots would be supplemented by raster dots from another channel. However, this solution cannot always be applied and is dependent on the expected shade.

Yet another solution is conversion of thin lines from vector into bitmap form. In this case the raster generates differently (see Picture 8), because RIP processes tend to compensate the missing dots through addition of smaller complementary dots (similarily to anti-aliasing). In that case it is crucial to save the bitmap with loss-less compression type. Also, it is not advised to use this solution with textual layers and objects placed in close proximity to each other.

Guilloches and securing elements are a special case in which the objects should always be prepared in vector form with 100% fill of one color (one of process colors or standarized, like PANTONE® or HKS®).



Picture 7 Zoom simulation of a very thin line rasterization output. Print on the left will be jagged and also will seem to be lighter than expected due to „missed" raster dots. Print on the right shows a thicker object - in this case, printed image should be smoother.



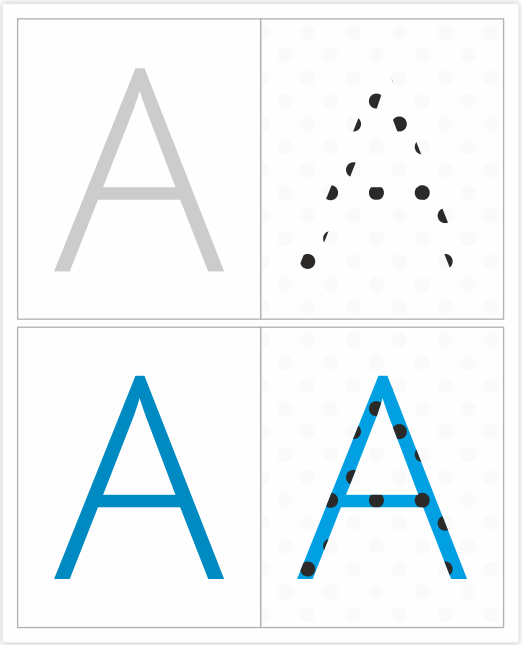
Picture 8 Zoom simulation of a vector object (left side) and bitmap object (right side).

3.3.3 Textual layers

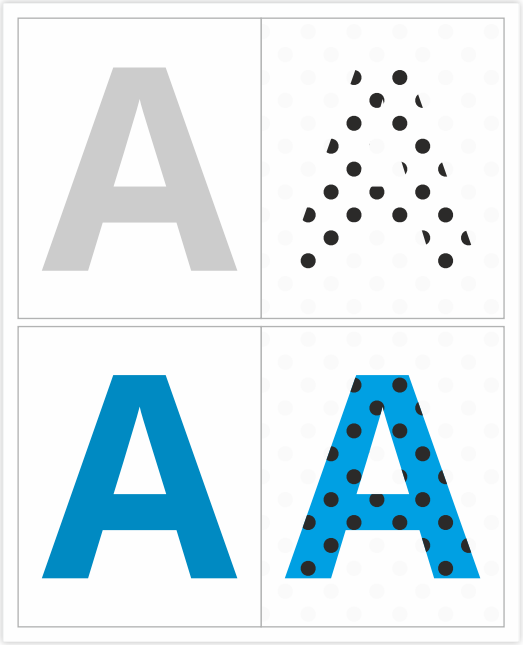
In general, any font style can be used for production files. It is however recommended not to change text layers into vector shapes if it is not necessary. The reason for it was already explained in section 3.3.1 *"Vector or bitmap object"*. However, at least font's used subset must always be embedded in the file. Also, it is advised not to include text layers of font size smaller than 5 pts.

For the same reason as with thin lines described in section 3.3.2 *"Thin lines & objects"*, it is generally advised not to use very light tints for text layers, especially thin font styles or small font size. Letters, being much more complicated figures than lines, may become distorted to a point of a viewer being unable to read them. Instead, for text below default 12 pts font size it is recommended to use at least regular thickness font styles with at least one of CMYK colors being the 100% dominant in order to secure the shape of each character.

This recommendation applies to small or thin text layers. The higher the font size, the less noticeable the jagged shapes become, hence the aforementioned solution does not have to be applied with high font size text layers.



Picture 9 Comparison zoom of simulations of a very small & thin font size of single 20% tint (approx) and the same font style text with additional fill color. As seen on the top, the letter may be unrecognizable.



Picture 10 Comparison zoom of simulations of a very small yet thicker font size of single 20% tint (approx) and the same font style text with additional fill color. As seen on the top, even though thicker than in Picture 8, the letter still seems to be distorted.

Chapter 4

Additional information

4.1 Scope of responsibility

Please note, that while Qartis is solely responsible for the technological process of the print, it cannot be held responsible for the way the production's artwork was prepared by an external company and to what extent said files are in accordance with the specification.

Not adheading to the requirements and recommendations found in this specification may render the file being unusable in terms of expected quality and/or beyond the point of repairs by our DTP studio, thus not possible to print correctly. Should the client wish for the files to be amended, the studio has to assess the files and decide whether if or to what extent the corrections can be applied basing on the current state of the files - it includes technological amendments as well as changes to contents.

Moreover, the technological process may require changes due to unsuccessful correlation between production files and initial assumptions of the order.

4.2 Control list for designer/agency

Project name

Dimensions

- ○ format correctness
- ○ bleed application
- ○ safe-guarding distance
- ○ proper height and distances of magnetic stripes

Setting

- ○ card pages on separate document pages
- ○ center aligned artworks
- ○ trim marks / punch shape application

Colors & objects

- ○ CMYK conversion
- ○ PMS® / HKS® / other conversion
- ○ proper setting of additional elements
- ○ proper setting of unprintable elements
- ○ proper overprint application
- ○ no ICC profiles embedded
- ○ proper image resolution
- ○ loss-less compression method used
- ○ no active form elements used

Textual layers

- ○ font or sub-font embedded in the file
- ○ proper font sizes

Optimalization

- ○ vector/bitmap consideration
- ○ simplifying filters and effects
- ○ transparency flattening
- ○ rastering with background
- ○ layers count reduction

Quality & content

- ○ proofreading
- ○ securing small/thin vector objects and textual layers
- ○ logos in vector object form
- ○ black ink level application

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