

P/mint[®]

Technical Specifications

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I. Overview

This document defines technical requirements for materials supplied to P/mint Sp. z o.o. (the Printing House), general quality standards of products produced by the Company, quality controlled parameters, as well as definition of acceptable products.

II. Definitions

Visual references – materials used as a reference for colours in the printing process. A visual reference can be a printed sheet signed by the Client or a certified contract proof. A master material can also be a non-certified proof or print from previous copies, however colour on such a master is treated only as a general reference.

Proof Certification – process of checking of proof accuracy, determined as colour difference between values measured on test control patches placed on the proof, and target values. Target values are determined by ICC profile, with which the proof is printed. Proof certification may be carried out at the Client's facility or at the Company.

Certified Proof – proof with indicated results of colour differences between itself and the target (CIE ΔE) measurements. Colour difference may not exceed the tolerance limit defined in commonly used Quality Standards.

ICC Profile – digital file containing colour characteristics of a given device. That profile meets requirements specified in ICC Specification.

Distribution List – document in the form of a table containing information concerning the method of preparation of dispatch of particular copies batches, including quantities (packing standard, pallets, quantity of pallets), copies versions, dispatch addresses, method of sorting, packaging and labelling.

Imposition file – a file where artworks are placed on the sheet (packaging, display parts etc.) according to the layout of the die-cutting tool used for cutting out the sheet.

Bleed – area of an image exceeding beyond the crop marks defining net page size or beyond the shape of the product. Lack of bleeds may cause quality issues during post-press processes.

III. Specifications for preparing print materials

1. Preparation and delivery of digital materials for sheet-fed offset printing

1.1. Digital materials can be delivered via:

- an FTP (File Transfer Protocol) to the designated server
- Access to the server - login (username) and password can be provided by the Customer Service Representative (technologist) or Sales Person serving your company.
- InSite portal

Access to Insite portal - login (user name) and password are provided by the Customer Service Representative or Sales Person serving your company. Logging in to InSite is possible via a web browser at: <http://insite.p-mint.eu>

The name of a dispatch (folders) may not include any local (diacritic) language signs, spaces and special characters (* > ! ? < : / \ etc.). Only the following characters are permitted: a b c d e f g h i j k l m n o p q r s t u v w x y z 1 2 3 4 5 6 7 8 9 0 and _.

- applications such as Dropbox, Google Drive, OneDrive, or an online file transfer platform such as weTransfer.

— **1.2.** The printing files should be prepared in the following file formats:

- Postscript level 1, 2 or 3 (separated or composite),
- PDF 1.4 – 1.6 (Acrobat 5-7)
- PDF/X-1a:2001
- AI (provided that fonts are changed to curves and all graphic elements used are included)
- EPS (as above)

The Printing House **recommends** composite files, prepared in scale 1:1. Separated files should not be prepared due to complex imposition process and introduction of automatic trapping. ZIP compression is recommended, JPG Maximum Quality compression is acceptable if graphic elements allow for it.

— **1.3.** The resolution of artworks included in digital files for packaging and commercial works:

| Minimum | Optimal | Maximum |
|---------|---------|---------|
| 250 dpi | 300 dpi | 450 dpi |

| | | |
|--|---|----------------|
| <i>For displays and posters, the minimum resolution of artworks is</i> | — | 200 dpi |
| <i>For digital printing</i> | — | 150 dpi |

The Printing House will reduce to 300 dpi the resolution of all colour and greyscale images exceeding 450 dpi.

By supplying an image with lower resolution than the minimum above means acceptance of an inferior quality reproduction of that image.

— **1.4.** The resolution of 1-bit images shall not exceed 2400 dpi.

— **1.5.** Graphic elements must not include attached ICC profiles (no tagged profiles).

— **1.6.** Graphic elements must not include OPI (Open Prepress Interface) comments.

— **1.7.** Supplied files must not contain copy-dot elements without prior agreement with the Company.

- **1.8.** Before sending the materials to the Printing House it is recommended to preflight the files with the use of an appropriate software applications, such as Adobe InDesign (version CS4 or higher), | Adobe Acrobat (version 6.0 or higher) or Enfocus PitStop to detect the most frequently occurring errors.
- **1.9.** The client must indicate to the Customer Service Representative the differences between versions/ mutations and provide the naming scheme used for the files. The name of a file should contain a description of the version.
- **1.10.** The date of delivery of digital materials shall be considered the date of delivery of completed materials not requiring amendment.
- **1.11.** Failure to keep these terms of delivery may cause delays in shipping the finished product, for which the Company shall not be responsible.

2. File generation

- **2.1.** The Company recommends composite files in PDF generated with Adobe applications.
https://p-mint.eu/files/Pmint_indesign_export_to_pdf.pdf

The Company allows also files created by PS file conversion using Adobe Acrobat Distiller in version 5.0 or later according to manual available for download on website: QUAD_SPC_Distill-

https://p-mint.eu/files/Pmint_distill_post_script_files_to_pdf.pdf

- **2.2.** In case of questions, please send us sample files and contact your Customer Service Representative. We also recommend visiting: <https://p-mint.eu>
- **2.3.** In case of starting cooperation it is obligatory to send us sample files.

3. Total area of ink coverage

- **3.1.** For certain paper type groups the Total Area Coverage (TAC) is determined and it can be used during the preparation of files. If TAC is exceeded, some defects may appear and the Printing House takes no responsibility for them. TAC value for coated materials is 330 and for other group of materials this value cannot exceed 280.

4. File naming standards

- **4.1.** A separate file should be generated for each product piece (packaging, display part etc). Also for two-sided print, separate files should be created for front (recto) and back (verso) side.
- **4.2.** All files delivered to the Printing House should be named in a way that allows for an unambiguous assignment of a file to the printing order. Subsequent versions of the same file should have a different name, for example, they should include a subsequent number.
- **4.3.** If a filename is ambiguous and does allow to prepare printing files on time, the Printing House takes no responsibility for any resulting delays.
- 4.4.** The name of a file may not include any local (diacritic) language signs, spaces or special characters (* > ! ? < : / \ etc.). Only the following characters are permitted: a b c d e f g h i j k l m n o p q r s t u v w x y z 1 2 3 4 5 6 7 8 9 0 and _.

5. Layout

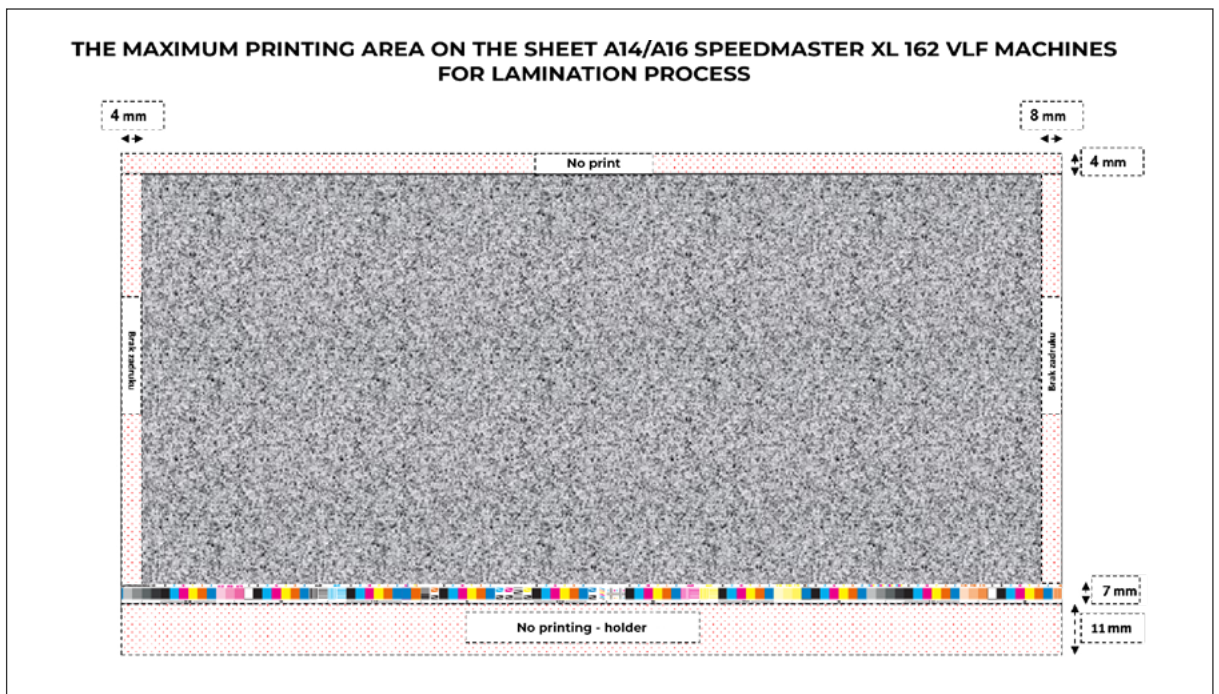
5.1. Each page should have bleeds of at least 5 mm width.

5.2. **Die-lines layout** (in vectors) should be overlaid on the graphics (in 1:1 scale) in the trim location. The colour of the die-lines, contrasting to the artworks, should be defined as an additional colour (SPOT) with the name, e.g. CUT, and have an attribute OVERPRINT. In addition, Specifications POS 6 the die-cutter layout may contain selective varnish omission for gluing, marked with a frame filled with diagonal lines and a designation of the flute direction in the corrugated cardboard.

5.3. Finishing elements, such as selective UV coating or gilding, etc. should be overlaid on the graphics (in 1:1 scale) in their exposure location. Any finishing elements should be saved as a separate LAYER in an open graphic file. in a PDF file they should be created as an additional colour (SPOT) with the name, e.g. UV COAT and with an OVERPRINT attribute. If finishing elements are placed on the next page of a PDF, it is also necessary to include the die-cutter layout. All texts and graphics in which the sharpness of edges is important should be submitted in vector format. Selective varnish coating should be saved in vector format (due to plotter cutting of the varnish coating form).

5.4. Preparation of knockouts for the lamination process (applies to plano printing).

- Knockout on the side of the measuring strip (gripper side) 11mm
- One of the margins - area without graphics and varnish of at least 8mm width, on the opposite side area without graphic and varnish of at least 4mm width
- On the opposite side to the measuring strip (grippers) knockout a minimum of 4mm (without graphics and varnish).



5.5. In case of UV printing on metallic foil, a mask should be prepared for those graphic elements that will not have metallic effect. A mask (white coating ink) will be printed as an underprint and other colours will be overprinted on it.

—— **5.6.** Important texts or graphic elements should be positioned at least 3 mm from the trim edge.

—— **5.7.** Minimum type size for one colour printing is:

- 6 pt for sans-serif fonts
- 7 pt for serif fonts with differentiated strokes thickness

Minimum type size for items composed of than one colour or reverse printed is:

- 8 pt for sans-serif fonts
- 10 pt for serif fonts with differentiated strokes thickness

—— **5.8.** Minimum permissible line thickness is 0.2 pt. Reverse printed lines or in more than one colour should be at least 0.75 pt thick. This also applies to serif fonts with differentiated stroke width.

—— **5.9.** In order to obtain richer black depth and avoid picking effect in areas with high ink coverage, black should be composed of 4 colours. the recommended formulas are C 70, M 60, Y 60, K 100 for coated papers and C 50, M 40,Y 40 K 100 for uncoated papers.

—— **5.10.** Inaccuracy may be avoided by trapping, that is minimal overlapping of colours one on another. When submitting composite files, which are of preference by the Printing House, the Client should not make any trapping. This process is conducted in the Printing House, unless agreed otherwise with the client. If the Client submits separated files, the Printing House is unable to include trapping, so it must be made by the Client. the recommended trapping value is 0.05 mm (0.144 pt).

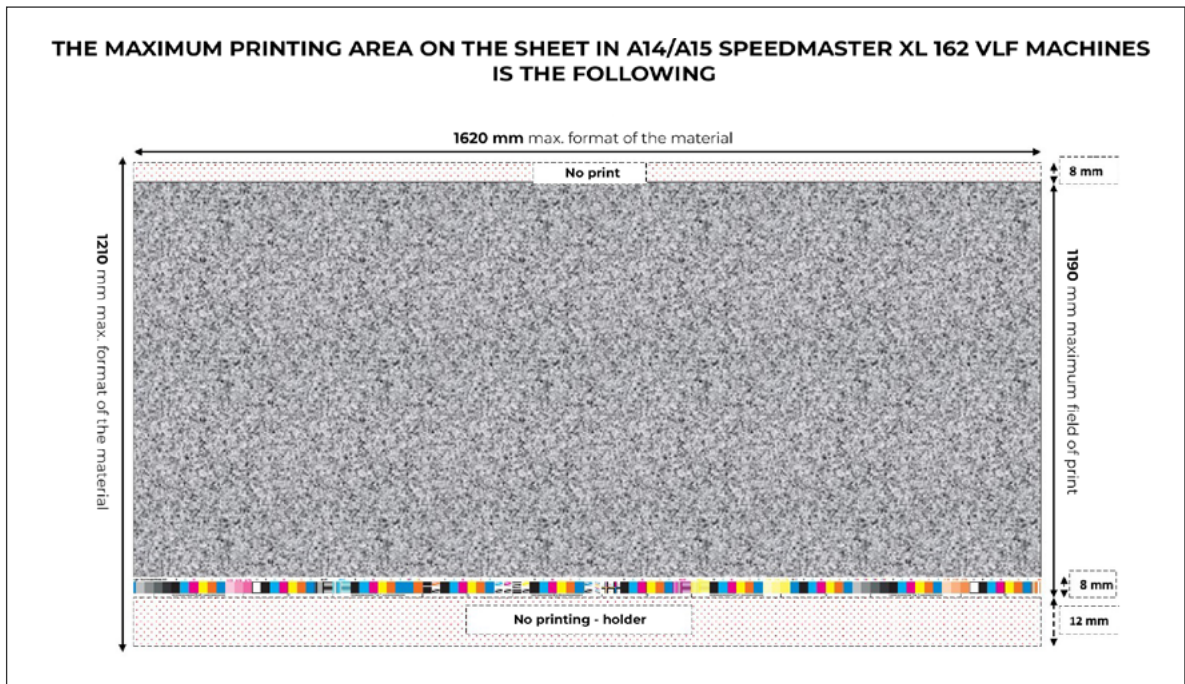
For reverse printed text on black background composed of 4 colours, negative trapping for CMY colours of 0.17 mm (0.5 pt) is needed.

If spot ink is used for printing (Pantone, metallic colour), a CMYK spread must be made towards the spot colour (Pantone, metallic colour).

—— **5.11.** A black text smaller or equal to 24 pt placed on a colour background must be overprinted. The exception are texts (K or CMYK) on spot colours (Pantone, metallic colours), where knockout should be applied, according to point 5.10 above with K or CMYK spread towards the spot colour. All graphic elements printed over spot colours (such as shades) must also have knockout feature applied and trapping applied in similar manner. This is the only way we can ensure proper representation of all graphic elements. Black texts larger than 24 pt may be made of 4 colours according to the formula specified in point 5.9 above.

—— **5.12.** All graphic elements and photography should be prepared in CMYK colour space. If provided in other colour spaces (RGB, CIE LAB), they will be converted to CMYK space with ISO Coated v2_300_eci ICC colour profile with perceptual colour rendering. All spot (e.g. Pantone®) colours, if not agreed differently with Printing House, should be converted into CMYK space as well.

—— **5.13. IMPORTANT!** When printing on large format sheet printers, the print control strip is positioned on the gripper side. This has to be considered when preparing files for «plano» printing. There is a 20 mm space from the gripper side (at the bottom of the sheet) (12 mm for holders + 8 mm of the print control strip field), and no graphic elements or printing registration can be positioned there.



6. Separation

6.1. ICC profiles used for generating separations should be adjusted to the paper type on which the printing is done according to the ISO 12647-2 standard. ICC profiles can be sent to clients by their Customer Service Representative. Profiles recommended by the Company should be used. Using other ICC profiles is permissible only in agreement with your Customer Service Representative.

The Printing House takes no responsibility for the final product, if files have not been prepared in accordance with the above guidelines or if they contain objects imported directly or indirectly from CorelDraw or AutoCad software. The Printing House also has the right to refuse the acceptance of any files not consistent with this specification.

All additional operations aimed at correcting the files in order to reach consistency with specifications and all changes made by the Company at the Client's request are considered additional paid service.

7. Visual references

7.1. Attaching a contract proof to each project is recommended.

7.2. Contract proofs should be made after the last correction of files submitted for printing.

7.3. The ICC profile acquired by the Customer Service Representative should be used for making a contract proof.

7.4. On the printed proof, ICC profile used, Ugra/FOGRA v. 2.2 or 3.0 Control Strip and printing date should be included. Lack of any of those makes it impossible to use a contract proof as a visual reference in the Company.

7.5. If the customer accepts the print, a sheet accepted and signed by the customer becomes the visual reference for the offset operator.

- **7.6.** Prints from previous printing runs are not contract proofs and may only serve as reference for the operator. Using this type of visual reference may lead to the probability of obtaining a different colour as a result of lack of information on the preparation of materials and the printing process or as a result of a different positioning of the graphics on the sheet.
- **7.7.** If the Client does not deliver contract proofs, the print will be carried out according to Lab coordinates of primary colours corresponding to the ECI profile of the job and dot gain specified by ISO 12647-2 standard for a given paper group.
- **7.8.** Detailed requirements concerning methods of control proof preparation are included in Basic Quality Standards (chap. IV, item 1.1.2)

8. File preparation for digital printing

- **8.1.** Printing files should be prepared in PDF or EPS file formats.
- **8.2.** In order to use the high quality of the print offered by the machines, the files should be at least 150 dpi (300 dpi maximum) in 1:1 scale. Of course, files of lower resolutions will also be printed but the Printing House does not take any responsibility for the print quality at such low resolution.
- **8.3.** The file should be prepared in 1:1 scale, in CMYK colour space. By prior arrangements, it is also possible to print from RGB files or with special colour (e.g. Pantone) in a file (colour shall be converted automatically to CMYK with the most accurate matching possible).
- **8.4.** If the file should contain a cutting or punching outline, it should be created in accordance to the following requirements:
 - an outline (thickness 0,1 – 0,25 pt – without special effects on contour) with the following attributes: SPOT COLOR and OVERPRINT
 - overlaid on the artworks (in 1:1 scale) in the cut location
 - it has to be on an active layer, with enabled PRINT attribute
 - outline should be aligned to the center
 - the colour of the die-cutter defined as an additional colour (colour type: SPOT colour) with an attribute of the overprint (OVERPRINT) should be contrasting with artworks. In addition, **the die-lines layout** may contain selective varnish omission for gluing, marked with a frame filled with diagonal lines and a designation of the flute direction of the corrugated cardboard.
 - the creasing line - defined by the spot colour named BIGA or CREASE
 - the cutting line - defined by the spot colour named CIECIE (without Polish characters in the name) or CUT
 - the partial cutting line - defined by the spot colour named CZESCIOWE CIECIE (without Polish characters in the name) or PARTIAL CUT
 - it is recommended to send die-lines layout in a separate PDF file with the layout only, without the graphics (in 1:1 scale)
- **8.5.** Die-lines or cutting lines must be outlines and in spot colours. If are prepared in CMYK, they might be printed together with the artwork. If a file is provided without die-lines or cutting lines, please provide an overview file with the artwork and die-lines.

- **8.6.** It is possible to print according to the Client's colour proof. There is a possibility to print a proof in the printing house. If there is no provided proof, the jobs are printed by default with ISO Coated V2 profile (the digital printing standard in P/mint). In the case of printing from RGB files, the jobs are printed with a profile embedded in the file (most often it is a device profile: camera, scanner, etc.).
- **8.7.** It is possible to profile the substrate delivered for printing. However, this requires prior contact and discussion of the details.
- **8.8.** Maximal sheet and print size is **1600 x 3140 mm**.
- **8.9.** Maximal sheet size for digital cutting is **1660 x 3180 mm**.

9. File preparation for cutting plotter

- **9.1.** Jobs to be cut on plotter should be delivered in **DXF, CF2 or ARD** (ArtiosCAD native format) files. Due to limitations of DXF format, if a file is delivered in this format, visual graphics or a Project Card (PDF or JPG file) must be enclosed that will present types of lines in the file and a description of the type of lines (cut, crease, perforation, milling cut, etc.).
- **9.2.** The supplied ARD files must include correct colour coding of cutting and creasing lines. It is recommended to supply a **PDF or JPG file as visual aid**.
- **9.3.** The production file must be supplied in 1:1 scale. the graphics with the cutting outline should also be supplied as visual aid.
- **9.4.** In the case of executing the entire order at P/mint (printing, die cutting, etc.) **the graphics have to include cut marks indicating the most extended knife/die-cutter elements**. They will serve as a fitting point for a plotter or a die-cutting machine. The marks should be made in the standard way - taking into account the 3mm or 5mm graphic bleed.
- **9.5.** The maximum cut size for digital plotter is 1660 x 3140 mm
- **9.6.** The minimum format possible to cut on an automatic plotter is 600x870mm.
- **9.7.** The precision range of the manual cutting is $\pm 0.2\text{mm}$. The repeatability of cutting is $\pm 0.2\text{mm}$.
- **9.8.** The precision of automatic cutting is $\pm 0.5\text{ mm}$. The repeatability of automatic cutting is $\pm 0.5\text{mm}$.

IV. Production Standards

1. Printing process

- **1.1.** Colour
 - **1.1.1.** The colour of the finished product should be as close as possible to the colour of the properly made contract proof supplied by the Client, taking into consideration the specificity of offset, paper quality, proof characteristics and other factor affecting the colour of the copy.

— **1.1.2.** Requirements concerning contract proofs

A control strip Ugra/FOGRA should be placed on every proof. Each proof delivered to the Printing House should have a certificate confirming its correctness. The current standard in force for contract proof certification is ISO 12647-7:2016.

| Acceptable proof | Non acceptable proof |
|-------------------------------------|-------------------------------------|
| Avg $\Delta E_{00} < 2.5$ | Avg $\Delta E_{00} > 2.5$ |
| Max $\Delta E_{00} < 5.0$ | Max $\Delta E_{00} > 5.0$ |
| Substrate max $\Delta E_{00} < 3.0$ | Substrate max $\Delta E_{00} > 3.0$ |
| Primary max $\Delta E_{00} < 3.0$ | Primary max $\Delta E_{00} > 3.0$ |
| Primary max $\Delta H < 2.5$ | Primary max $\Delta H > 2.5$ |
| Gray avg $\Delta Ch < 2.0$ | Gray avg $\Delta Ch > 2.0$ |
| Gray max $\Delta Ch < 3.5$ | Gray max $\Delta Ch > 3.5$ |

Measuring conditions: white backing, D50 illuminant, 2° standard observer.

Measurement mode: M0 (absolute value, without UV filter and polarizing filter).

The proof must be made with the ICC profile provided by the Printing House's Customer Service Representative (Technologist). Every proof must include simulation of a printing substrate.

- **1.1.3.** If the proof is not made according to the specification, it will not be considered a contract proof. In such case, the Printing House will make a contract proof at the Client's cost. If the Client does not agree for the preparation of a proof, the Client's proof may serve as the visual reference for the operator but this may mean a different colour of the print.
- **1.1.4.** Optical densities of the printing process are selected in such a way as to ensure that Lab values of solid CMYK patches, corresponding to primary Lab values obtained from standard ECI profiles, are obtained on paper of a given group and with given inks.
- **1.1.5.** Printing control tolerance for particular sheet accepted by the Client or by an authorized Printing House employee.

| | Acceptable | Non acceptable |
|-----------------|----------------|----------------|
| Optical density | $\leq \pm 0,1$ | $> \pm 0,1$ |
| Dot gain | $\leq \pm 4\%$ | $> \pm 4\%$ |

Measuring conditions: black backing, E (DIN) status, relative value, no polarizing filter.

- **1.1.6.** Consistency of colours between the contract proof and the printed product is assessed visually at D50 standard lighting as per ISO 3664:2009 standard.
- **1.1.7.** If it is necessary to obtain optimal consistency with the visual reference, Lab values of solid patches may exceed the tolerance limits specified in ISO 12647-2 standard.
- **1.1.8.** In order to ensure the best quality of colour reproduction in relation to the correctly produced contract proof, the Printing House may apply additional optimisation of input data.

— **1.2.** Colour registration

Permissible deviation of registration of colours printed consecutively

| Acceptable | Non acceptable |
|------------|----------------|
| ≤ 0,1 mm | > 0,1 mm |

— **1.3.** Additional Pantone® colours

Due to lack of possibility of densitometric control of colour intensity, a correct colour is considered to be a colour that visually fits between sample (-) and sample (+) supplied by the ink manufacturer. Additional colours should be individually accepted by the Client.

Pantone® colour system

Pantone colours are printed in accordance with the current Pantone® colour system not older than 2 years. the Printing House does not bear any responsibility for unmatched colours compared to an old Pantone® colour system.

— **1.4.** Perforating during printing tolerance from the theoretical perforation line for longitudinal and lateral perforation (rotary die cutter)

| Acceptable | Non acceptable |
|------------|----------------|
| ≤ 1 mm | > 1 mm |

— **1.5.** Picture and varnish layer registration in selective varnish coating.

| Acceptable | Non acceptable |
|------------|----------------|
| ≤ 1 mm | > 1 mm |

— **1.6.** Varnish layer

The offset, dispersion or UV varnish layer is considered incorrect if it contains some uncoated areas on the sur- face intended for varnishing.

1.7. Due to offset printing specificity, the process is accompanied by ink rubbing off the printed area. the Printing House will do its best to minimize this occurrence but cannot guarantee its complete elimination.

2. Finishing process

2.1. Sheet cutting (cardboard, solid cardboard)

Permissible deviation of sheet cutting to single items:

| Acceptable | Non acceptable |
|-------------------------|----------------------|
| $\leq \pm 1,5\text{mm}$ | $> \pm 1,5\text{mm}$ |

2.2. Off-line folding and perforations

2.2.1. Folding - permissible deviation of fold from the nominal line of its position (on each fold).

| Acceptable | Non acceptable |
|-------------------------|----------------------|
| $\leq \pm 1 \text{ mm}$ | $> \pm 1 \text{ mm}$ |

2.2.2. Perforation - deviation of the preformation from its nominal position.

| Acceptable | Non acceptable |
|-------------------------|----------------------|
| $\leq \pm 1 \text{ mm}$ | $> \pm 1 \text{ mm}$ |

2.2.3. Final deviations of the performed folds and perforations also result from permissible deviations in earlier technological processes, i.e. printing and cutting of the sheet.

2.3. Mounting (Laminating)

Due to the wide range of raw materials with different quality parameters, matching of graphic elements - consultation is necessary before starting the order.

Acceptable deviations:

| Single sided | Double sided |
|-------------------------|-----------------------|
| Acceptable up to 1,5 mm | Acceptable up to 2 mm |

2.4. Die cutting

Acceptable deviations

| Non-laminated | Laminated |
|-----------------------|-----------------------|
| Acceptable up to 1 mm | Acceptable up to 2 mm |

IMPORTANT!! On recycled cardboard from GD group that are not finished with thermofoil, some cracking effect may occur at the edges of creased places when folding and some shredding at the edges of the cardboard at the point of cutting with a cutting knife. This defect mainly results from the structure of the raw material.

2.5. Thermofoil lamination

Acceptable deviation: up to 5 mm at the longer side of the sheet
up to 10 mm at the shorter side of the sheet (overlap)

3. Delivery Acceptance Criteria

Delivery is considered consistent with the order when at least 98% of the product has quality parameters within the tolerance range permissible by this specification.

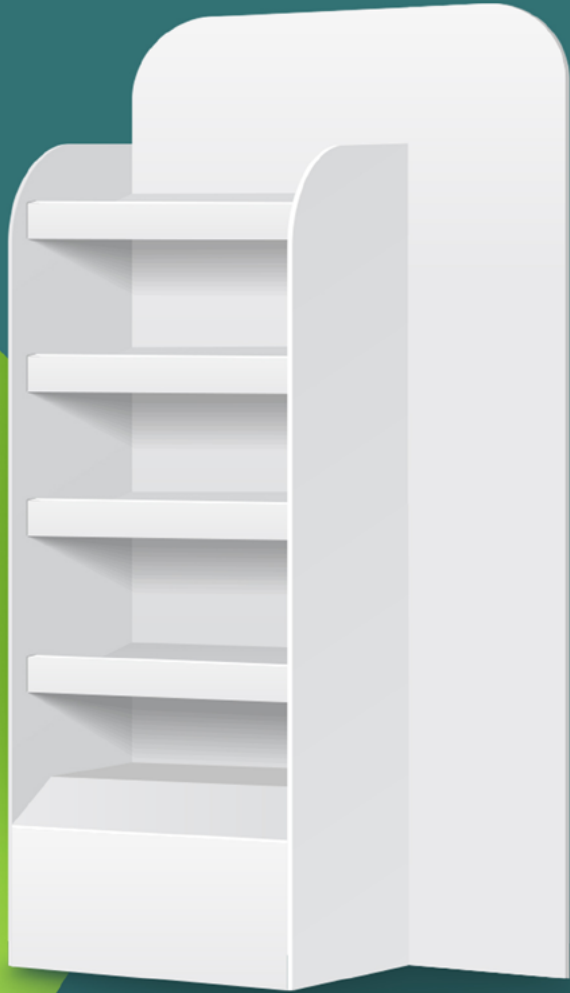
Any comments or reservations should be submitted within 14 days of shipment date.¹

4. Terms and conditions concerning storage of cardboard and paperboard products such as packagings and displays

Detailed information is provided in a separate file at <https://p-mint.eu>

https://p-mint.eu/files/Pmint_storing_conditions_for_cardboard.pdf

¹ A period of 14 days applies, unless the individual contract specifies otherwise.



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