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Physical characteristics of e-Passport

Specification of e-Passport booklet

e-Passport MOLDOVA_July_2024_ver. 1.0

Date	Prepared by	Service for:
	PWPW SA	Public Service Agency
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Below specification lists chief features of all types of passport and travel document booklets specified by the beneficiary:

Citizen Passport (PA)
Travel document for stateless persons (PC)
Travel document for beneficiaries of humanitarian protection (PH)
Travel document for refugees (PT)
Diplomatic Passport (PD)
Official Passport (PS)

The final specification is to be prepared based on mutual agreements between the Purchaser - PWPW and actual sample passport booklet produced for verification purposes.

e-Passport booklet description

Introduction

Passports produced by PWPW SA are manufactured in ISO 14298 (Intergraf) certified production plant to meet stringent security measures as required for national level identification documents. Similarly the graphic design is adapted and processed in secure, separated from the Internet environment based on a special software that is available only for authorized users that design and manufacture security documents and banknotes. As such final editable artwork is not available outside PWPW. Only simplified versions in .pdf or .jpg formats are shared with the authorized stakeholders of the project.

Basic physical features:

- Booklet dimensions: 125 x 88 mm +/- 0,75 mm, according to ISO/IEC 7810.
- Booklet construction includes:
    - cover comprising integrated contactless circuit (chip) located in the back, with hot foil embossing and blind embossing on the front,
    - inner sides of the cover (end papers) printed with offset, intaglio, silkscreen and letterpress printing (serial number),
    - polycarbonate card with entire thickness not exceeding 0,76 mm and comprising at least 6 layers, printed with offset and silkscreen, integrated with passport booklet with sewing method through durable and flexible hinge material,
    - 32 inside (visa & remarks) pages, printed with offset.
- Passport booklet is prepared for 10 years usage and meets the durability standards as defined and verified according to ICAO Technical Report.

Structure of the polycarbonate (PC) card

The polycarbonate card is a multi-layered structure made of polycarbonate (PC) material and the hinge material. Particular layers and elements of the PC card are fused together by means of pressure lamination process. The structure of the PC card would entail not less than 6 polycarbonate layers among which one comprises a large area DOVID (transparent hologram). Respective layers of the PC card are overprinted with offset printing including minimum 8 visible colors and 4 invisible fluorescent colors on each side of the PC card (title page and data page side). Moreover, optically variable ink (OVI) is applied by silkscreen on the data page side.

The PC card contains a variety of different security features such as guilloche background, rainbow printing, special inks, embossing of the surface, MLI or CLI with pre-printed lenticular effect, OVI, DOVID, transparent window with color changing effect, tactile features, etc. 1st, 2nd and 3rd level security features are available on the PC card.

After binding inside the passport booklet the PC card is prepared for laser engraving personalization including possibility of applying tactile feature (raised 3D).

The PC card has a flexible hinge in order to integrate it with the passport booklet. The hinge material is placed between polycarbonate layers and connected with them through its openings by means of lamination. The surface of the hinge is secured with visible and/or invisible print which may exhibit special properties under UV light.

The hinge constitutes both the robust and durable technical element of PC card construction as well as a bearer of security features of 1st and 2nd level.

Particular elements of design and construction of the PC card are visible only in UV and/or in IR. The proposal for document artwork and visualization of security features will be presented and agreed with the customer in full compliance with tender and customer's requirements.

Applicable standards

*Passports manufactured by PWPW meet the world standards for travel documents set forth by **ICAO Doc. 9303** recommendations for TD -3 travel documents (passports).*

*Furthermore – passports offered as Type A and Type B are fully compliant with applicable regulations of **European Union** (in particular Council Regulation # 2242/2004 including its amendments and acts following it). Passports offered as Type C may include minor deviations for UE regulations.*

*Electronic properties of the e-Passport and electronic data page are covered by **ISO/IEC 7816** and **ISO/IEC 14443** group of standards. Please refer to general information on chip in "Applied chip basic characteristics" section below.*

*Moreover the data pages are tested internally in PWPW against the following standards: **ISO/IEC 10373** and **ISO/IEC 24789** adequately to the intended usage of the e-Passport and applied PC components.*

Technical and security features

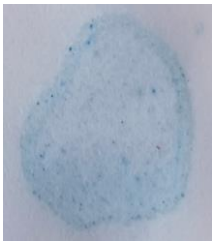
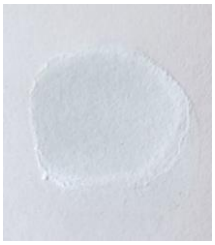
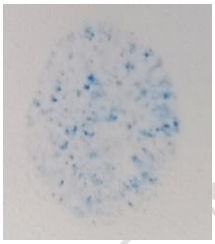
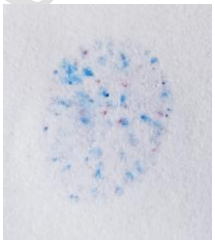
The following technical and security features are applied:

Feature	Description
Security paper	UV dull paper, pigmented white (whitish) color. Paper composition of wood-pulp and cotton (minimum 60% cotton), with appropriate absorbance and roughness, applicable for inkjet printing. Basis weight: 125 gsm (for endpaper) and 90 gsm (for inside pages) Chemically reactive paper (samples of chemical sensitizers attached), mandatory for inside pages, optional for endpaper as per customer's decision (see table "Chemical sensitizers in passport paper" at the end of the document). Selection of security fibres including: - invisible security fibres (visible in UV; Turquoise/Blue-Yellow-Red) - invisible security fibres (visible in UV; Yellow) - security fibres visible both in daylight and UV (VIS Pink/Magenta UV Red)
Watermark	Job specific design - dedicated exclusively for Moldova passport project Registered multi-tone watermark on inside pages.
Security thread in paper	Security thread 1,5 mm width, embedded in paper of inside pages - with microtext REPUBLICA MOLDOVA, direct and mirror reflection - with UV properties
Cover	Electronic cover consisting of three layers: outer layer made of synthetic material, middle polymer layer with chip and inner layer made of paper. Contains name of the country, coats of arms, name of the document and biometric document ICAO logo applied with foil by hot stamping and national ornament applied with blind embossing.
Individual graphic design of inside pages	Depending on customer's artwork proposal and requirements regarding the design - each page may include different artwork (may require additional time to be foreseen and accepted by customer in the project and delivery schedule).
Printing / application techniques deployed	The following techniques are used during manufacturing process: - offset printing - intaglio printing - silkscreen printing - hot stamping - hot lamination - letterpress printing - laser perforation - laser engraving
Inks	The following inks are used during manufacturing process: - offset (pantone, visible or invisible in daylight and UV/Bi-UV fluorescent, UV fluorescent, IR metameric inks (IR drop-out), anti-stokes); - silkscreen (iridescent, OVI (visible under UV light, anti-stokes)); - intaglio (pantone, IR metameric inks (IR drop-out)); - letterpress (visible in VIS / UV / IR); Different options of ink will be a subject of discussion with customer.iridescent ink on endpapers (silkscreen)

Rainbow Printing	At least 2 rainbow colors are used during offset printing of guilloche backgrounds of inside pages, PC card (title and data page). endpapers, visa pages. Depending on the artwork provided by customer rainbow effect is also possible in VIS and UV or UV only guilloches. Rainbow printing is mainly an anti-copy security feature. Printing of a continuous line with color transition is not possible to achieve with commercially available ink-jet and laser printers, as well as thermal-transfer printing. Any attempted imitation is easily detectable.
Guilloche background	At least 2 visible colors are used during offset printing of guilloche backgrounds of inside pages, PC card (title and data page) endpapers, visa pages. Depending on the artwork provided by customer guilloches are also possible in VIS and UV or UV only. Guilloche lines are an anti-copy security feature which prevent from document counterfeiting and altering biographical data. The resolution required to produce sharp, thin and continuous lines is only achievable with offset printing, which is usually unavailable to counterfeiters. Creating state of the art guilloches design requires dedicated computer software which is accessible only for authorised security printers.
Relief effect	Depending on the artwork provided by customer guilloches may also include relief (3D) effect in offset print.
Microtexts	Microtext (character height in positive not exceeding 0,25 mm and in negative – not exceeding 0,35 mm, nominal values as per design, not including ink width's growth during printing) is a text illegible without magnifying glass. It can contain fonts of variable size to hinder unauthorized duplication. Also, printing technics enable applying positive and negative microtexts.
Deliberate error	Applied as a deliberate spelling and/or deliberate printing error. Deliberate error is a security feature that makes it easier to recognize counterfeit documents. A counterfeiter who does not know the location of such a protection will not apply it in the fake document. Deliberate printing error - alternative type of deliberate error, the nature of this feature consists in deliberately misprinting/damaging one of the repetitive elements of the design and thus slightly distinguishing it from other identical elements correctly printed elsewhere in the document.
Optically Variable Ink	OVI print (on PC card) OVI is a special type of security ink that displays a shift of color when observed at different angles. OVIs of specific color shifts are not available for non-secure applications and may be applied only by security printers. OVI will be visible under UV light. OVI screen ink (on the endpapers) for printing graphical feature size up to 2,5 cm2
UV fluorescent inks	At least 4 colors on each side of PC card (including rainbow effect in UV and bi-fluorescent inks). At least 4 colors on remarks and visa pages (including rainbow effect in UV and bi-fluorescent inks). At least 3 colors on the inner cover layer. Inks that are invisible in daylight and visible in UV are suitable for protecting document's holder data and photo, as well as integration of graphic design. In daylight they do not hinder data and photo verification.
IR absorbent/ Transparent inks	On PC card and/or end-paper. A pair of inks with identical color in daylight but different appearance when observed in IR light (only part of the graphic element appears visible in IR light).
Intaglio print (endpaper)	At least 2 colors, including IR absorbent/transparent inks on endpaper, with microtexts, microprints and latent image .

Hologram / DOVID	Semi-transparent DOVID embedded inside the PC card located on a large area (at least 70mm x 35mm) to protect main personalization data. Recorded in a e-beam high resolution (min. 24 000 dpi) lithography technology, including view angle depending features like kinetic and switch, effects, volume/3d effects, color coding and images, guilloche fine lines, microprints and nano prints of 1st, 2nd and 3rd level. Modern DOVIDs production involves sophisticated and exclusive technologies (e.g. electron beam lithography) which are not commercially available. They offer high resolution security features comprising images, microtexts, nanostructures and advanced optical effects which are very difficult to simulate.
Transparent Window with O.V.M.™	Security feature in the construction of the substrate, where part of non-transparent substrate is removed and/or replaced with transparent material. Achieving transparent window which changes its color according to the color of the background on which is viewed is possible by using O.V.M. materials. The window will change its color from blue (on light background) to red (on dark background), additionally there will be embedded image that will appear as a third color (yellow-green). Both, the background and the embedded image will be UV light reactive (yellow-green luminescence for the embedded image and red luminescence for the background). Size of the window area: 10 mm x 10 mm.
MLI/CLI	MLI/CLI is a tactile feature, which contains fine lens structures integrated on the data page surface during lamination of PC card. This feature is a kind of optically variable device, which creates the possibility of implementing angle dependant elements, both in a form of pre-printed during data sheets offset printing (before lamination) steady lenticular effect or as a variable laser image comprising data and passport's holder secondary photo, engraved during data page personalization.
Surface embossing on both sides of PC card	Obtaining sharp and fine convex shapes on the surface of PC card created during lamination process with job specific designed laminating plates. This thickness irregularity of PC card surface profile protects against adding a film on top of the data page with the impostor's data or photo substitution by means of scratching and milling. It also allows for easy verification of document authenticity by means of touch.
Booklet binding (sewing)	Booklets are sewed by lock stitch where ends of the thread are hidden inside the book (between the cover and the inlay) and are not accessible without visible damage to the book. Each ply of the thread has different color in daylight (blue, yellow and red) and different properties in UV (yellow and red).
Booklet serial number	Serial numbering of the passport booklet is performed by: 1/ Laser perforated holes - conical numbering (located on bottom of the page) through paper pages 3-34).nd cover. Laser perforated number may include special mark (s) - geometric figures (i.e. triangle) instead of regular holes in selected place of the number. 2/ OCR letterpress number, with UV (green) and IR visible, printed on the bottom of the inside front cover 3/ 1D barcode, IR visible, appearing on the external sticker applied on the back cover 4/ Laser engraved serial number on title page. Consecutive serial numbering is guaranteed. For full traceability no booklet without serial number leaves our production plant.
Security feature of level 3	At least one security feature of level 3 (examined under special conditions) will be coordinated with the beneficiary.

CHEMICAL SENSITIZERS IN PASSPORT PAPER

 Bleach	 Sodium Hydroxide 10%	 Hydrochloric Acid 10%	 Sodium Carbonate 10%	 Ethanol
 Isopropanol	 Benzyl alcohol	 Benzene	Extraction Gasoline	 Trichloroethylene

Additional information

Technologies applied and listed above basic security features will be adequately applied to provided artworks.

Moreover, in order to avoid ambiguities we do confirm the passports will include security features as listed in tender documentation in the following documents:

- ST_MD_35_37603221_231_2024
- ST_MD_35_37603221_232_2024
- ST_MD_35_37603221_233_2024
- ST_MD_35_37603221_234_2024
- ST_MD_35_37603221_235_2024
- ST_MD_35_37603221_236_2024

Offered passports will be fully prepared for laser engraving personalization of the PC card both on the title and data page.

Applied chip basic characteristics

MTCOS 2.5 in P71D352

Common Criteria Certification

CC Certification
BSI-DSZ-CC-1147-V3-2023
BSI-DSZ-CC-1147-V2-2023
Report BSI-DSZ-CC-1147-V3-2023
Security Target BSI-DSZ-CC-1147-V3-2023
Certificate BSI-DSZ-CC-1147-2020
Report BSI-DSZ-CC-1147-V2-2023

Application Features

Authentication Mechanisms as used for *ePassports*:

Basic Access Control

Password Authenticated Connection Establishment (PACEv2)

- with Generic Mapping (GM) and Chip Authentication Mapping (CAM)

- including PIN and PUK user authentication Extended Access Control (EACv1)
  - Chip Authentication
  - Terminal Authentication

Active Authentication

Technical Details

KEY FEATURES

Performance

- Best-in-class performance:

– < 200ms for a M/Chip transaction

– < 2s for ePassport SAC

- Broadest reader interoperability by self-tuned EMD noise reduction
- Fast operating system download to flash memory (100KB/s)

Technology

- First payment and secure identification device implemented in CMOS40 technology
- Full flash memory solution up to 344 KB
- Up to 500 KB non-volatile memory available

- Most advanced RF front end technology to maximize communication sensitivity

Security

- AdvancedIntegral Security 3.0 architecture
- EMVCo and CC EAL 6+ (PP 0084 with loader package 2) certification taking latest attacks on security into account
- Fully certified symmetric, hash and asymmetric cryptography libraries
- Up to RSA 4096 bits and ECC 640 bits key length

Quality control in PWPW plant

The quality control is accomplished based on the PN-ISO-2859-1 norm, titled "Sampling procedures for inspection by attributes", according to the sampling plan.

A PLAN OF THE ACCEPTANCE INSPECTION OF A LOT ACCORDING TO THE PN-ISO 2859-1 STANDARD

The batch of booklets is verified in regard to is conformity, with Client-approved acceptance or pattern documents.

According to the abovementioned standard, developed test plan used during the receiving inspection, based the acceptable level of quality (AQL)

I. STAGES OF QUALITY INSPECTION

1) Inspection of booklets for compliance with the graphic design contained in the project documentation or approved by the ordering patterns
2) Inspection according to the inspection plan based on the PN-ISO-2859-1 norm

II. A PLAN OF THE ACCEPTANCE INSPECTION OF A LOT ACCORDING TO THE PN-ISO 2859-1 norm

Inspection level II – standard for sample of the optimum size

Special level S3 – used when it is necessary to use a small sample, e.g. because tests are time-consuming, harmful or destructive

Normal inspection – standard at a given level in circumstances provided for by the PN-ISO 2859-1 it is acceptable to change the type of inspection onto a reduced or tightened one.

Sampling plan – single – a sample for the test is selected randomly and only once. The number of sample items inspected shall be equal to the sample size given by plan. If the number of nonconforming items found in the sample is equal to or less than the acceptance number, the lot shall be considered acceptable. If number of nonconforming items is equal to or greater than the rejection number, the lot shall be considered not acceptable.

Nonconformity classification:

Class A (critical defect) – those nonconformities significantly affect the product. They endanger document functionality or identification. The accepted AQL for this class has the value of 0.15 in the case of II inspection level and 0.4 in the case of the special S3 inspection level.

Class B (major defects) – those nonconformities can make it difficult to use the document or they will significantly change its appearance. The acceptable AQL for this class has the value of 1.0 and **2.5** in the case of inspection level II and 2.5 the case of the special S3 inspection level.

Class C (minor defects) – those nonconformities do not limit the use of the document but may negatively affect its appearance. The acceptable AQL for this class has the value of 4.0 in the case of inspection level II and 4.0 the case of the special S3 inspection level.

The quality inspection of passport booklets shall be accordance with the sampling plan presented bellow (Table 1), appropriately for each characteristic selected for inspection. If the nonconformities for an inspected characteristic do not exceed the number (i.e. AC), the characteristic fulfils the quality criteria. If the AC acceptable number for any characteristic be exceeded, the lot does not fulfil the requirements.

Table 1 – Quality acceptance plan for a product lot

Item	The inspected characteristic	The object of the inspection	Inspection level	AQL	Notes
1	Security, functionality and identification elements of the booklets VIS (background graphics, elements of security printing, paper, binding, hologram, hinge and numbering)	Presence	II	0.15	In accordance with the pattern, technical specification and reference samples.
		Appearance, colouring	II	2.5	
		Data page elements position	II	1.0	
		Cover, visa pages, end pages elements position and size	II	4.0	
2	Print elements in UV, IR and up-converter	Presence	S3	0.4	Elements active in UV light are checked for correct reproduction, colour and intensity of UV light consistent with the pattern. Visibility/invisibility in IR light are checked for correct reproduction consistent with the pattern.
		Appearance, colouring	S3	2.5	
3	Paper	Appearance	S3	4.0	Visual assessment evaluation in transmitted light
		Position	S3	4.0	In accordance with the tolerances
4	Data page	Lamination	II	0.15	In accordance with the pattern and reference samples.
		Personalization area appearance	II	2.5	
		Beyond personalization area appearance	II	4.0	

Table 2 – positioning tolerance of individual elements

Item	Element	Tolerance	Notes
1	Position of the offset field on the data page	horizontally +/- 2,6 mm vertically +/- 2,9 mm	Relative to the left (88 mm) and the bottom (125 mm) edges of the data page
2	Position of the OVI elements in relation to the offset print	horizontally +/- 1,5 mm vertically +/- 1,5 mm	Data page
3	Position of the MLI elements in relation to the offset print	horizontally +/- 1,5 mm vertically +/- 1,5 mm	Data page
4	Position of the DOVID elements in relation to the offset print	horizontally +/- 1,5 mm vertically +/- 1,5 mm	Data page

5	Position of the hot stamped golden elements on the cover	horizontally +/- 2 mm vertically +/- 2 mm	Relative to the right (125 mm) and the top (88 mm) edges of the cover in the closed booklet
6	Position of the letterpress numbering	horizontally +/- 1,5 mm vertically +/- 1,5 mm	Relative to the right (125 mm) and the bottom (88 mm) edges of the cover in the open booklet
7	Position of the laser numbering	horizontally +/- 2 mm vertically +/- 2 mm	Relative to the right (125 mm) and the bottom (88 mm) edges of the cover in the open booklet
8	Position of the watermark (visa pages)	horizontally +/- 6 mm vertically +/- 6 mm	In the transmitted light; relative to the „spine line" and the bottom (88 mm) edge of the booklet
9	Position of the security thread (visa pages)	horizontally +/- 8 mm	In the transmitted light; relative to the „spine line"
10	Position of the offset texts on the endpages	horizontally +/- 3 mm vertically +/- 3 mm	Relative to the right/left (125 mm) and the top (88 mm) edges of the cover in the open booklet
11	Position of the offset texts on the visa pages	horizontally +/- 3 mm vertically +/- 2 mm	Relative to the „spine line"(inside) and the top (88 mm) edge of the page in the open booklet

Checking the quality of execution of booklets is conducted according to above-mentioned Quality acceptance plan, and criteria in Tables 1 and 2, respectively for each of the evaluated elements. Existing non-compliance are not summed for comparison with number of eligible AC. Exceeding the number of eligible AC is checked only for each properties alone.

Packing methods

Basic packaging includes standard card board boxes containing 100 passports each.

Boxes of 100 passports are packed into larger cases/containers according to selected shipment mode and Customer's warehousing conditions. Further details - to be agreed

Packaging of ready-made booklets for delivery: inner card boxes with 100 passports each, with the content information label on the box. 10 boxes of 100 passports each are placed in large outer cardboard box with a hoop strap fastening, numbered seal and anti-humid foil apply. All placed on pallet. Alternatively (if larger boxes are accepted by customer) - a wooden box with sealed plastic bag inside and metal enforced edges and corners to protect against mechanical damage is used, fits either 5 000 or 10 000 passports. Both pallets and wooden boxes are accessible from all sides by forklift. Wooden boxes are stackable (2up) to optimize warehousing.

Packaging units and methods are agreed with the customer taking into account both secure and durable packaging and optimal production process in the relevant customer sites and is a part of passport technical data sheet.