The Council of the European Union

PRADO

Glossary

Technical terms related to security features and to security documents in general (in alphabetical order)
Preface

This publicly available glossary, first issued in 2007, is an example of successful cooperation between European document experts from all European Union Member States and Iceland, Liechtenstein, Norway and Switzerland who regularly meet in the Council’s Working Party on Frontiers/False Documents – Mixed Committee.

The purpose of this glossary is not only to explain technical terms used in document descriptions in PRADO (PUBLIC REGISTER OF AUTHENTIC IDENTITY AND TRAVEL DOCUMENTS ONLINE), but also to promote the use of consistent terminology and contribute to mutual understanding as a basis for effective communication and for police and administrative cooperation – in 23 official EU languages. It is also intended to help raise awareness among those having to check identities and ID documents - document experts will not be able to decide on the authenticity of a questioned document unless suspicions are raised by PRADO users who ask their local police, or the responsible national contact point, for further guidance.

Contributing to better communication and cooperation is a means of combating illegal immigration and organised crime and strengthens security at the external borders and elsewhere.

I would like to thank all those who made it possible to produce this PRADO Glossary.

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Directorate General Justice and Home Affairs
General Secretariat of the Council of the European Union
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Introduction

This glossary is included to assist the reader with terms that appear within PRADO; it does NOT provide scientific definitions – its main purpose is to help anyone who is not involved in checking security documents on a daily basis to understand the wording and to recognise some of the more important security features contained in travel and identity documents. To this end, simple, non-exhaustive definitions, examples and explanations are provided.

In order to consult the same chapter in a different language version of this document, look for the corresponding grey three-digit chapter number on the top right-hand side of each chapter.

Please send any suggestions for improvements and observations on errors and bugs to: helpline.PRADO@consilium.europa.eu

We suggest you to first consult the chapter on IDENTITY FRAUD AND DOCUMENT FRAUD if you want to read this alphabetic glossary e.g. for training purposes.
Anti-scan / anti-copy pattern

Anti-scan / anti-copy patterns are printed security features integrated in the background / security printing to protect against simulation through copying. The printed images and patterns contain embedded (hidden) information (usually constructed of fine lines) that is invisible to the naked eye under normal inspection conditions but becomes visible or legible or causes flaws (mistakes) to appear after copying or reproduction with a scanner.
2nd example:
Orientation- and angle-modulated fine-line structures (SAM = Screen Angle Modulation)
Background / security printing

Background / security printing serves as a protection against counterfeiting and manipulation of data.

- **Background / security printing** consists of print designs and security elements, like e.g.
  - guilloches / fine-line patterns
  - microprint
  - rainbow colouring
  - see-through register
  - latent image
- **Other security printing** techniques and printing processes used include e.g.
  - intaglio printing, as well as e.g. security inks (e.g. OVI, fugitive ink).

For background printing, traditionally offset printing is used as a background to other security printing techniques and security elements like e.g. intaglio printing, pre-printed text and biographical data in security documents.
Background / security printing with various features, here:

- guilloches / fine-line patterns
- grid pattern
- microprint
- solid-coloured areas, and
- relief fine lines.

Not to be confused with: **Pre-printed text.**
Barcode / 2D barcode

Machine readable information.
See also: Machine verifiable feature

A barcode (1D barcode) stores data in the widths of, and spaces between, printed parallel lines (bars) for machine-optical data capture.

A 2D barcode (two-dimensional barcode) stores data along two dimensions and is therefore capable of containing much more information:
Binding technique

*Binding* is the act of combining single sheets to form a book, booklet or brochure. Most common *binding techniques* used for ID documents:

*Thread stitching* - "stitched in the spine" (saddle stitching with *stitching thread*).
Overall construction: a booklet may be constructed as a single booklet or a multiple booklet.

**Reinforcing strip**: makes for a stronger construction:

See also: ➔ Laminate integrated by binding
Biodata / photo / signature integration

*Biodata / photo / signature integration* refers to an operation whereby a printing, (laser-) engraving or photographic technique is used (as opposed to a typewriter or writing by hand) to incorporate an image (photograph of holder), a signature or biodata text directly into the substrate or laminate during the personalisation process.

**Photo integration:** The image will not constitute a separate (e.g. glued) component of the document, but will form an integral part of it: the photo is printed on (sometimes also, in addition, a *Secondary (ghost) image*, e.g. converted into a perforated pattern design on) the *visual inspection zone* (*VIZ*) on the biodata page.

*Integration* here is *independent* of whether the biodata text / image is laminated or not.

See also: *Biographical / other personalisation text*

**Integration techniques:**

- Inkjet printing
- Laser engraving
- Laser printing
- Photographic process
- Thermal dye sublimation
- Thermal transfer printing

Laser-engraved integrated image
Biodata, photo & signature integration by **photographic process**
Biographical / other personalisation text

**Personalisation** is the process whereby the document holder’s image, signature and biographical data are incorporated into a document.

The holder’s **biographical data (biodata)** appear in the **visual inspection zone - VIZ** and in the **MRZ (Machine Readable Zone)** of a passport (on the biodata page), ID card or visa; in **e-passports** they are also included in the **microchip**.

See also: **Holographic personalised security thread**

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**Integrated biodata card (biodata page) of a passport**

**VIZ**

**MRZ**

See also: **Biodata / photo / signature integration**
Biometric identifier (biometric data)

A biometric identifier is a personal biological (anatomical or physiological) or behavioural characteristic which can be used to establish a person's identity by comparing it with stored reference data. Traditionally, the most popular biometric identifiers are fingerprints and the facial image. Other frequently used biometric identifiers include the iris image and hand geometry. Biometric identifiers can be used for biometric recognition processes such as facial and iris recognition. The method of measuring biometric identifiers is known as biometrics.

- e-Passport

In e-passports, biodata are stored in an embedded microchip (integrated circuit). Pursuant to ICAO (International Civil Aviation Organization) specifications, a contactless microchip - as a minimum requirement - stores the data contained in the MRZ (Machine Readable Zone) of the biodata page of the passport and the facial image as the interoperable biometric identifier. Additional biometric identifiers, e.g. fingerprints, or iris images, are also included.

The biometric data on the chip can be compared with the document holder's biometric characteristics and the data on the biodata page of the document. This can for example be done manually, by using a document reader, or an automated e-gate system can be used. As a safeguard to protect the authenticity and integrity of the stored data, a digital signature is used. The technology used is called the ICAO Public Key Infrastructure (PKI). The digital signature can be used by checking authorities to ensure that the data in the chip of an e-passport come from the correct, trusted issuing authority and have not been altered.

An ICAO-compliant e-passport will feature the international e-passport symbol on its outside front cover:

See also: Biographical / other personalisation text
See also: Biodata / photo / signature integration
See also: Machine readable travel document (MRTD)
See also: Machine verifiable feature
Bleeding (penetrating) ink

Bleeding (penetrating) ink is a security ink containing dyes which, together with the solvent used, penetrate ("bleed out or through") the paper substrate so that any attempt at mechanical erasure will cause visible damage to the document.

Serial number printed in bleeding (penetrating) ink

Part of the numbering ink has bled through the paper substrate and can be seen on the reverse side.

Not to be confused with ➔ fugitive ink.
**Co-axial light**

*Co-axial light* is light that passes through an optical system parallel to the optical axis (e.g. retroviewer), for instance where the direction of illumination and direction of observation are in parallel. Co-axial light is used to reveal hidden motifs in *retroreflective laminate* (e.g. 3M Confirm® laminate).

The angle of view is co-axial to the (re-directed) light beam:

See also:  
- **Oblique light**
- **Transmitted light**
- **UV light**
Collation mark / floating numeration

(Columns of the dynasty of Gediminas)  ("LTU")

Collation mark is originally a bookbinding term. In order to produce a complete work (brochure, book, periodical, etc.), the various parts (sheets and folded sheets that have been nipped - sections) must be collated in the right order. This is ensured by placing collation marks as check marks (in the case of books, usually at the spine of the book block) in a staggered arrangement from top to bottom.

In passports, this type of check mark is an additional safeguard. It makes it easier to spot whether any pages have been exchanged or removed.

It can be invisible under normal light fluorescent overprint, or a visible feature (using normal ink or fluorescent ink).

The combination of collation mark and page numbers is sometimes called floating numeration.
Coloured security fibres

Coloured security fibres are fibres in various colours which are mixed into the paper pulp during the paper manufacturing process, so that they are embedded in the paper in random places at varying depths - different on each page.

See also: Substrate without optical brightener

The colour makes security fibres stand out clearly against the paper; they can easily be seen with the naked eye.

See also:

- Fluorescent fibres
- Planchettes

Not to be confused with synthetic fibres (which contribute to the mechanical properties of the substrate).
DID® - Diffractive Identification Device

The DID® is a type of \textit{DOVID (Diffractive Optically Variable Image Device)}. The DID® contains two diffractive colours visible at direct reflection angle. On a 90° in-plane rotation a clear colour switch is visible. This enables easy examination.

Different foil effects from other \textit{DOVIDs} can be incorporated.

See: \textit{OVD (Optically Variable Device)}
### Document code

The document codes used in this database for AUTHENTIC (GENUINE) DOCUMENTS are made up of the following components:

For example: "FRA-AO-01001" - this code consists of:

- "FRA" for **France**, the document country = 3-letter country code
- "A" for **Passport** (national passport) = Document category
- "O" for **Ordinary** = Document type
- "01001" (5 digits), of which the first two ("01") and the last three ("001") = Document number and Version number

The following documents can be described in PRADO:

<table>
<thead>
<tr>
<th><strong>Document categories:</strong></th>
<th><strong>Document types:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>A Passport *</td>
<td>O Ordinary document</td>
</tr>
<tr>
<td>B Identity card</td>
<td>D Diplomatic</td>
</tr>
<tr>
<td>C Visa</td>
<td>S Service / Official</td>
</tr>
<tr>
<td>E Entry paper</td>
<td>F Military</td>
</tr>
<tr>
<td>F Driving licence</td>
<td>P Emergency / Provisional</td>
</tr>
<tr>
<td>G Vehicle licence/ log book</td>
<td></td>
</tr>
<tr>
<td>H Residence document</td>
<td>Y Related / associated document</td>
</tr>
<tr>
<td>I Seafarers' identity document</td>
<td></td>
</tr>
<tr>
<td>J Travel document issued to non-nationals</td>
<td></td>
</tr>
<tr>
<td>K Train driving licence</td>
<td></td>
</tr>
<tr>
<td>L Crew Member Certificate / Pilot's Licence</td>
<td></td>
</tr>
<tr>
<td>M Certificate for operators of pleasure crafts / Captain's licence</td>
<td></td>
</tr>
<tr>
<td>S Special authorisation card</td>
<td></td>
</tr>
<tr>
<td>V Authorisation to represent a company</td>
<td></td>
</tr>
<tr>
<td>W Work permit</td>
<td></td>
</tr>
<tr>
<td>X Other document</td>
<td></td>
</tr>
</tbody>
</table>

<p>| D Stamp                  | E Entry Stamp        |
| X Exit stamp             |                     |</p>
<table>
<thead>
<tr>
<th>Document category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>P</td>
<td>Civil status document</td>
</tr>
<tr>
<td>B</td>
<td>Birth</td>
</tr>
<tr>
<td>N</td>
<td>Nationality / Citizenship</td>
</tr>
<tr>
<td>I</td>
<td>Social security card / Tax card</td>
</tr>
<tr>
<td>A</td>
<td>Adoption</td>
</tr>
<tr>
<td>M</td>
<td>Marriage</td>
</tr>
<tr>
<td>U</td>
<td>Registered partnership</td>
</tr>
<tr>
<td>R</td>
<td>Divorce</td>
</tr>
<tr>
<td>T</td>
<td>Death certificate</td>
</tr>
</tbody>
</table>

*) All types of national passports

**Document category** is an **obligatory field** in the **document code** of each document **Document type** is **not** an obligatory part of the **document code**.

Not all of these document categories and document types are described in the PRADO database.

If a **FALSE DOCUMENT** is described in one of our other databases, its description uses the same document code as the corresponding authentic document, immediately followed by the number of detected false documents (in ascending order) within parenthesis:

For example: "FRA-AO-01001 (3)" - this is the third detected type of FALSE DOCUMENT which is based on the authentic document "FRA-AO-01001".
**Embossing stamp**

*Embossing* is an impression in relief made by means of a seal or stamp, e.g. to **authenticate** a document, or a conventionally fixed (e.g. glued) image of the holder in the document.

The impression appears with a partly raised / lowered surface both on the front and reverse side.

Authentication: See also:
- See also: [Relief embossing](#)
- See also: [Ink stamp](#)

See also: [Photograph of the holder - fixing methods](#)
Endless text

*Endless text* denotes repeated, sometimes unspaced, lines of text in the background / security printing or in a security thread.
Endless text may be **positive text:**

![Positive Text Example](image1)

or **reversed-out text:**

![Reversed-Out Text Example](image2)

→ **Miniprint and microprint**
FADO (False and Authentic Documents Online) has been established pursuant to the Council Joint Action 98/700/JHA.

1. Expert FADO, a classified ("RESTREINT UE / EU RESTRICTED") system, provides for the exchange of information (on false as well as genuine travel and identity documents) between document experts regularly meeting in the Working Party on Frontiers - Mixed Committee in the formation of false documents experts.

2. The access restricted iFADO (Intranet FADO) system is the second level of FADO. It contains the most important information for document and identity checking, derived from Expert FADO. It is for governmental and law enforcement use.

3. The PRADO system contains a considerably further reduced set of information on authentic documents and is made available to the public by the General Secretariat of the Council of the EU (GSC) via http://www.consilium.europa.eu/prado/en/prado-start-page.html.

The information is selected and provided by document experts in EU Member States, Iceland, Norway and Switzerland.

The information in all three systems is currently available in 24 official languages of the European Union.

Highest quality and reliability

- Documents are introduced by document experts all over Europe.
- The information contained is validated by all participating document experts.
- Several quality assurance and validation steps assure consistent and highly standardised information.
- High-quality translations are performed automatically by the system, as well as by specialised translators in the GSC.

The FADO system family is hosted by the Council of the European Union General Secretariat Directorate-General Justice and Home Affairs, Directorate Home Affairs - Unit Schengen, Visas and Borders (DGD 1A).

Its technical implementation and maintenance is performed by DGA 5.

helpline.PRADO@consilium.europa.eu
Fluorescent fibres

Fibres with fluorescent properties (visible under **UV light**) are mixed into the paper pulp during the paper substrate manufacturing process, to serve as a security feature. **Fluorescent fibres** show up in **random places at varying depths** - different on each page. They may be visible (**coloured security fibres**) or **invisible** under NORMAL LIGHT.

Fluorescent fibres can show one or more colours under UV light.

Invisible fibres (under normal light) fluoresce red, yellow & green under UV light.
Fluorescent hi-lites
Fluorescent planchettes
Substrate without optical brightener
Fluorescent hi-lites

*Fluorescent hi-lites* are very small fluorescent particles in the substrate (visible under **UV light**); they are mixed into the paper pulp during the paper substrate manufacturing process to serve as a security feature.

*Fluorescent fibres*  
*Fluorescent planchettes*  
*Substrate without optical brightener*
Fluorescent ink

Ink containing not only colour pigments, but also fluorescent substances (pigments), used to print both text and motifs, is called fluorescent ink. This type of ink is visible under normal light and fluoresces under UV light.

**Fluorescence** is a short-lived light emission which ceases to glow practically immediately after the illuminating light source has been extinguished - within $10^{-8}$ seconds.

Not to be confused with **fluorescent overprint**.

See also: **Background / security printing**
Fluorescent overprint

Fluorescent overprint is invisible (colourless) under normal light, but fluoresces (i.e. is visible under UV light).

Not to be confused with fluorescent ink.

See also: Laminate UV feature
Fluorescent planchettes

Planchettes (small coloured discs) with fluorescent properties (visible under UV light) are mixed into the paper pulp during the paper substrate manufacturing process to serve as a security feature. Fluorescent planchettes may be either visible or invisible under normal light.

See also: Fluorescent fibres
See also: Fluorescent hi-lites

Substrate without optical brightener
Fluorescent security thread

A thin strip of plastic, metallic, or other material is embedded or partially embedded in the substrate during the paper substrate manufacturing process; a fluorescent security thread fluoresces when exposed to **UV light**. This reaction can also be multi-coloured.

See also: **Security thread**

See: **Substrate**
Fluorescent serial number

A unique *document number* is printed on a document and assigned as an additional safeguard for identification; a *fluorescent serial number* fluoresces when exposed to **UV light**.

See also:  
**Numbering**
Fluorescent stitching thread

A fluorescent stitching thread is a thread (it can also consist of several individual, interlaced, threads) that is used for holding together the pages of a booklet, which fluoresces in one or several colours when exposed to UV light.

See also: Stitching thread
Fugitive ink

_Fugitive ink_ is a type of _soluble ink_ which dissolves in certain solvents or water; for example when a forger tries to erase and alter personalisation text which is printed on top of it, this ink causes parts of the security / background printing to disappear or bleach.

Not to be confused with ➔ _bleeding (penetrating) ink._
Gravure printing

This printing technique, similar to \textit{intaglio printing}, uses printing plates with recessed areas or cells which form the printed image.

The printing plate comes into direct contact with the substrate. The depth and size of the recessed cells determine the amount of ink that is transferred to the substrate. Very fluid and rapidly drying inks are used. This also allows inks to be printed on top of one another. The cell structure may sometimes be seen.

In \textit{security printing} the gravure printing technique is for example used for \textit{laminate overprint}:
Guilloches / fine-line patterns

Fine (intricate) designs, consisting of interlaced continuous lines, are arranged in geometric patterns.

Security printing uses designs of guilloches or of other fine-line patterns with the aim of raising the barrier for re-origination and reproduction. Guilloches and other fine-line patterns are sometimes combined with rainbow colouring.
Hologram

The hologram is the most popular traditional type of DOVID (Diffractive Optically Variable Image Device) that is used as a security element. A number of effects are possible, e.g. 2D holograms (2-dimensional holograms) with structural and colour changes, 3D holograms with images, holograms with kinematic effects, etc.

2D hologram

3D hologram

OVD (Optically Variable Device)
Hot foil stamping

Hot foil stamping involves the transfer of foil by means of a heated stamping die; it can be regarded as a form of letterpress printing. The basic differences between hot foil stamping and letterpress are the use of stamping foil instead of viscous ink as the printing medium, and the indirect heating of the printing form. Due to the combined effect of temperature and pressure, a layer of foil is released from the carrier, at the points where the stamping die has raised areas, and is then transferred to the substrate in which it is permanently and indelibly embedded.
Hot foil stamping is often used to print text and motifs on passport covers - for example *gold stamping* (019), or *silver stamping* (020).

Hot foil stamping is also used for the application of ➔ *holograms* and ➔ *kinegrams*®, etc.
The Identigram® is a **holographic security feature** used for example in passports and ID cards, combining several individual elements:

- a holographic facial image of the holder (**secondary (ghost) image**)
- the **MRZ** (**Machine Readable Zone**)

and elements that are identical for all documents of the series, here, for example:

- the German eagle in 3D
- kinematic structures
- macroprint
- **microprint**
- **machine verifiable features.**

**OVD (Optically Variable Device)**
Identity fraud and document fraud

- **Impersonation:** A person - the impostor - practises deception under an assumed character, identity or name. Impostors always use genuine documents, so imposture, or impersonation for example also applies to an authentic passport containing a false visa or stamp, or to a genuine visa in a forged passport.

- **Fraudulently obtained document:** This generic term covers both authentic documents applied for on the basis of fraudulent source documents, as well as fraudulently issued authentic documents.

- **Expired document:** See expiry date ("Valid until") in the document. Then check if the document is, under applicable law, still valid for the purpose for which it is being used?

- **Misused document:** Includes suspected misuse - for example, a student visa is used for immigration, but the immigrating holder intends from the outset to work in the target country; this section of irregularly used documents also covers, if for example a short term residence permit is used instead of a visa, while only the holder of the type of permit "LONG-TERM RESIDENT - EC", a long-term resident's EC residence permit (Council Directive 2003/109/EC), or for example the holder of a diplomatic residence card, can lawfully use this type of permit instead of a visa (if a visa is required).

This identity and document fraud model was adopted by the EUROPEAN UNION DOCUMENT-FRAUD Risk Analysis Network (EDF-ARA 2012 Ref R023) and is also used by FRONTEX.
**iFADO**

*Intranet False and Authentic Documents Online*

**iFADO**, the "second level" of FADO, contains only unclassified, but circulation-restricted, information. The documents are not intended for the general public, but are labelled "LIMITE/LIMITED – FOR CONTROL AUTHORITY USE ONLY".

The target audience consists of all national and European authorities and law-enforcement agencies involved in checking identities.

**If you check identities, you also have to check identity and travel documents.**

See: ➔ Identity fraud and document fraud

To be able to do so, you have to know what the document should look like; in addition to the technical specifications (including security features) of authentic documents, **iFADO** informs you on the most common detection points for false documents.

➔ **When examining a document it is important to know its technical details**

**iFADO** is intended to help raise awareness and ascertain the authenticity of documents; doubts can then be followed up by document experts. **National contact points** (document experts and others) are provided in **iFADO**.

**iFADO** also contains information on typical forgeries and forgery techniques as well as guidelines on the detection of identity fraud.

**iFADO** contains the most important information on the validity and on other legal aspects of documents, as well as technical descriptions (including descriptions of the most important security features). Authentic travel documents and other identity documents, visas, stamps and some civil status documents of the Member States of the European Union and of many non-EU countries are described.
As **iFADO** describes **specimens** of genuine travel documents, visas and stamps, as well as **typical instances** of falsifications (with anonymised personal data), there is no overlap between **iFADO** and, for instance, SIS.

**iFADO** information comes from the classified "RESTREINT UE / EU RESTRICTED" Expert FADO system. The information contained in **iFADO** is selected and provided by document experts in EU Member States, Iceland, Norway and Switzerland (Expert FADO partners). The steering committee in the Council of the EU is the Working Party on Frontiers/False Documents.

**iFADO** is hosted by the General Secretariat of the Council of the EU (GSC), in the Directorate-General for Justice and Home Affairs (DG D). Technical implementation and maintenance are the responsibility of DG A CIS.

In addition to the central system and central access point (the central proxy), which are hosted by the GSC, national proxy servers have been set up and are operated by several FADO partners; this ensures faster and easier access for governmental and law-enforcement users in these countries.

### Target audience

National authorities involved in checking identities and identity and travel documents, and other European persons and bodies applying legislation/law-enforcement agencies, including for example:

- Border guards
- Embassies and Consulates
- Police
- Social security agencies
- Europol
- FRONTEX

Most of the text entries in **iFADO** documents are standardised descriptions which are translated automatically into the currently supported 24 official languages of the EU. Thus immediate availability as well as a high degree of standardisation is assured. Free-text descriptions are translated by specialised linguists in the GSC.

### Mission

The main aim of **iFADO** is to provide information to national authorities that (are required to) check identities. **iFADO** is intended to help raise awareness and ascertain the authenticity of documents; doubts can then be followed up by document experts.

### Motivation

Information on identity and travel documents and typical forgeries is not only relevant in the context of irregular and illegal immigration, but it is also important when dealing with all forms of organised crime, such as terrorism, drugs trafficking, arms smuggling and human trafficking. **iFADO** thus constitutes a significant tool in combating these phenomena, which are of concern to EU Member States, thereby helping to create a secure environment and to further the development of Europe as an area of peace, security and stability in the world.
Further proceedings in practice

Irrespective of a document’s origin, questions (including on particulars of foreign documents) are to be addressed to the respective National Contact Point for Identity and Travel Documents (contact details are available via the homepage of iFADO) by iFADO users.

For authorised personnel, access is always possible via the central proxy server in the GSC, and in some countries in addition via national proxy servers (intranet/national governmental networks).

Management of the end-user accounts and provision of end-user support are always the responsibility of the national authorities.

Access information, how to get an iFADO account: http://www.consilium.europa.eu/ifado/ifadocontacts.htm

See also: FADO
See also: PRADO
Image (printing) containing invisible personal information (IPI) or scrambled document related information

By means of special software tools a non-visible image is encoded in a visible image (in the printing).
For example

- individual information such as the passport number, or personalisation information like the holder’s name, is invisibly embedded e.g. in the photograph of the holder (IPI - Invisible Personal Information), or

- document related (static) information, such as e.g. the country’s name, is embedded in the background / security printing of travel documents (invisible "scrambled" information).

This information is invisible to the human eye, as it is printed in "scrambled" format; it can only be seen using a special decoder lens (a special viewer), or special technical equipment (including scanner or camera and image processing software).

Not to be confused with latent image, or with tilting effect.
Ink stamp

Liquid ink is transferred to the substrate by means of a stamp, e.g. for the authentication of a document or of a conventionally fixed (e.g. glued) image of the holder.

Authentication: See also:
- Embossing stamp
- Relief embossing
- Photograph of the holder - fixing methods

Proof of entry into the Schengen area at an external border.
Inkjet printing

*Inkjet printing* is a printing technique using a type of computer printer that operates by propelling tiny droplets of liquid ink directly onto the substrate, whereupon the ink penetrates the substrate. It can e.g. be used for ➞ **biodata / photo / signature integration.**
**Inkjet printing colour personalisation inside a polycarbonate card:**

Using special polycarbonate ink, personal data are printed on a PC layer in the course of the **PC (polycarbonate) card** production process; e.g. *Innosec Fusion®, Polycore®, PCC® or PCP (Polycarbonate Colour Personalisation)*.
PCP (Polycarbonate Colour Personalisation) technology
Intaglio printing

*Intaglio printing* is a printing technique producing a raised tactile relief (a *tactile feature*), which can also be recognised under *oblique light*. This characteristic of intaglio printing is also suitable to produce the effect of *latent images*. 

Raised (=relief) surface

Oblique light casting shadows
Not to be confused with **gravure printing.**

Not to be confused with *PEAK®* - a technology combining offset and intaglio printing: Colour (or other) changes are visible depending on the angle of view and the angle of incidence of light.

Not to be confused with **raised (tactile) laser engraving** in plastic laminates or cards.

Intaglio printing without using ink leads to paper deformation and can thus be used to produce an embossing effect produced by the lithographic process. It is also possible to produce inkless latent image effects using **blind intaglio (intaglio embossing).**

**Schablon (stencil) multiple colouring process**
Iridescent ink

Iridescent inks in general, as for example pearl inks, pearl lustre inks, or mother-of-pearl inks, contain transparent pigments consisting of a thin film containing tiny mica flakes. They cause interference with the incident light. This creates shiny, pearl-like shimmering effects which change in colour when the angle of view or illumination changes.
See also: **Iridescent laminate**
Iridescent laminate

An *Iridescent laminate* shows iridescent - shiny, pearl-like effects with change in colour when the angle of view or the illumination changes.

See also: *Iridescent ink*
See also: *Laminate*
See also: *OVD (Optically Variable Device)*
**Kinegram®**

The *Kinegram®* is a computer-generated hologram (DOVID) capable of producing multiple high-resolution images. It contains special types of computer-generated diffractive optical elements. These can be designed in different ways to exhibit **kinematic, colour changing, contrast reversal** and other special effects.
See also: **OVD (Optically Variable Device)**
Laminate

A laminate is a plastic film that is affixed to the document or biodata page as an additional safeguard by means of:

- Pressure: Cold-applied laminate
- And/or heat: Heat-applied laminate (heat-sealed laminate)

in order to protect data entries against falsification.

Example: Kinefilm® - heat-applied laminate with integral Kinegram® patch, existing in both metallised and transparent versions.

Thick heat-applied laminates can contain deliberately incorporated (designed) weak points.

Laminates can also incorporate specific security features which are usually not freely available on the market.

- Laminate overprint

Laminate overprint is a security element which tends to be placed on the reverse (=inner) side of the laminate, or between the layer of the adhesive and the laminate. This protects against wear and tampering. Laminate overprint can be visible or invisible under normal light: See: Laminate UV feature.

Laminate overprints tend to be printed using screen printing, gravure printing, or flexo printing.
• Laminate embossing

*Laminate embossing* are tactile features such as intricate designs of fine-line patterns or microprint which are incorporated into security laminates by embossing.
See also: [Relief embossing](#)
Laminate integrated by binding

In many passports with traditional biodata pages the holder's image and the biodata are safeguarded with a transparent laminate. In order to complicate manipulation, the laminate can be integrated in the passport booklet by binding. This will typically leave a strip of laminate forming a narrow margin on the facing page towards the back of the document:
Laminate integrated by binding, forming a margin on the facing page.

See also: Binding technique
See also: Laminate UV feature
Laminate UV feature

Either → fluorescent ink (ink which is visible under normal light),

or → fluorescent overprint (invisible under normal light) form printed security elements on the laminate; they tend to be placed on the reverse (=inner) side of the laminate, or between the layer of adhesive and the laminate. This protects against wear and tampering.
See also: Laminate
See also: Laminate Overprint
Laser engraving

Pictures and text are engraved in plastic laminates or cards by means of a laser. In the laser engraving process the data are written by blackening (carbonising) laser-sensitive foils (\(\Rightarrow\) PVC or sensitised \(\Rightarrow\) PC). Using different photo-sensitive materials, also colours can be obtained.

The depth of the laser effects can be deliberately targeted; several technical variations are in use:

- **Internal (layer-specific) engraving:** blackening in underlying layers through transparent (non-laser-sensitive) cover foils
  Examples are:
  - Germany: driving licence (given name, date and place of issue, signature)
  - Switzerland: ID card (surname, given name)
• Raised (tactile) laser engraving
  Examples are:
  • Germany: driving licence (surname, date and place of birth, serial number, driving licence categories)
  • Switzerland: ID card (e.g. date of birth on the front)

  Not to be confused with raised (tactile) \textit{Intaglio printing} on traditional substrates.

  See also: \textit{Variable laser image}
Laser perforation

Using laser technology, perforations of different types and sizes can be produced:

- **Laser-perforated serial number**
  
The ID document *serial number* is perforated through the substrate with a laser. Typical distinguishing marks are produced:
  - traces of burning round the edges of the holes
  - no raised edges round the holes in the substrate (paper) on the back of the perforations
  - conical decrease in size of the perforated holes in the booklet document when viewed from front to back
  - can have different shapes:

  ![First page of a booklet document](image1)
  ![Last page of the same booklet document](image2)

See also: [Numbering](#)
See also: [Secondary (ghost) image](#)
• Laser-perforated fine structures and designs (rip cuts)

*Rip cuts* are *designed to be* (deliberately incorporated) *weak points*. 
- **Secondary (ghost) image - laser-perforated**

Perforation is forming a secondary image of the document holder visible by transmitted light. Examples include: *Image Perf®,* Netherlands and Belgian passports.

See also: ➔ *Secondary (ghost) image*
• Laser perforation with \textit{tilting effect}

The individual letters of the TLI® (Tilted Laser Image) are perforated at different angles. Thus the image that can be seen by transmitted light changes depending on the angle of view.
**Laser print/copy**

A *laser printer* is a type of *digital printer* that uses electro-photographic processes.

Images are transferred to the substrate using *toner* as in the case of conventional photocopiers.

Laser printing is a possible integration technique for → biodata / photo / signature integration.

Biodata & photo integration technique: laser printing
MRZ - integration technique: laser printing
Latent image

- *Intaglio-printed* motif, visible when tilted and viewed under *oblique light*. Depending on the angle of the *oblique light*, the image appears light against a darker background or vice versa.

Depending on the angle of the oblique light "RP" is visible in a light or dark colour

Line structure (90º) of the latent image
Latent image revealed by tilting the document page

See also: ➔ Background / security printing
Letterpress printing

A printing technique in which the printing areas are raised, similar to a stamp. It is one of the oldest printing techniques. It is a direct printing technique, like also the (more modern) flexography, which can be used for printing on almost any kind of substrate, including for example plastic films.

In security documents letterpress printing is often used for printing sequential numbers such as serial numbers.

Not to be confused with indirect letterpress (dry offset).
Machine Readable Travel Document - MRTD

The specifications of Machine Readable Travel Documents (MRTD) - passports, visas and ID cards - are set out in document 9303 of the International Civil Aviation Organisation (ICAO). Most countries apply these rules in their machine-readable passports, visas and ID cards used for crossing borders. According to these standards, the biodata page of a MRTD is divided into two different zones:

- A Visual Inspection Zone (VIZ) containing the document designation, the holder's facial image, personal data and data concerning issue and validity.

- A Machine Readable Zone (MRZ) containing some of the information from the Visual Inspection Zone.

Example: Required elements of an ICAO-compliant Machine Readable VISA (MRV):

See: Machine verifiable features

See also: Microchip – contactless
See also: Password Authenticated Connection Establishment (PACE)
Machine Readable Zone - MRZ

In a **Machine Readable Travel Document (MRTD)**, the **Machine Readable Zone (MRZ)** contains some of the information from the Visual Inspection Zone in the form of a sequence of alphanumeric characters and the symbol “<”, forming two or three lines. This sequence of characters can be read by document readers in order to facilitate inspections of travel documents (OCR - **Optical Character Recognition** (OCR) – fonts).

**Form of the MRZ:**

- **ID1 / td1 format:** 86 (85,6) x 54 (53,98) mm.
  Three lines with 30 characters each, situated on the reverse side (verso) of the document.

- **ID2 / td2 format:** 105 x 74 mm.
  Two lines with 36 characters each, situated at the bottom of the biodata page or visa.

- **ID3 / td3 format (MRP – Machine Readable Passport):** 125 x 88 mm.
  Two lines with 44 characters each, situated at the bottom of the biodata page.

**Machine readable integrated biodata card (biodata page), ID3 format:**

See: **Document 9303** of the International Civil Aviation Organisation (ICAO).

See also: **Machine verifiable feature**
Machine verifiable feature

*Machine verifiable features (machine assisted document security verification features)* are security features that can be read and verified by machines (document readers); they serve to authenticate a travel or identity document by detection or measurement of special physical properties of document elements or structures and also contribute to the authentication of the holder of the document. See: [Machine readable travel document (MRTD)](

- **Barcode / 2D barcode**
- **Card Access Number (CAN) and Password Authenticated Connection Establishment (PACE)**
- **Machine Readable Zone – MRZ**
- **Microchip contact**
- **Microchip – contactless**
- **Magnetic strip**
- **Optical stripe**

Other (optional) **machine verifiable features** include

1. **structure related security features** such as e.g. [OVDs (Optically Variable Devices)], [retroreflective laminates] and [transparent windows]

2. **substance related security features**, such as **pigments** added e.g. to **security inks** as well as **coloured** and / or **fluorescent fibres** and [planchettes] added to the **substrate**

3. **data related security features**, like for example **holographic** or **magnetic security threads** which store encoded data, or [images (printing) containing invisible personal information (IPI) or scrambled document related information].
Magnetic strip

Thin strip of magnetic material attached to a plastic card and used for recording data.

See also: Machine verifiable feature
See also: Optical stripe
Metallic ink

Metallic pigments (pigment metals) like aluminium and bronze are used as components of printing inks to produce surfaces with a metallic sheen. Metallic ink is not a security ink in the strict sense, as it is freely available to any commercial printer. Metallic ink is nevertheless a typical anti-copy ink, as a copy (including one produced by a desktop printer) cannot render the original effect.
Metameric colours

Metameric colours are pairs of (chemically) different colours that can barely be distinguished in one type of illumination (usually in normal, broad daylight), but show a noticeable colour contrast in another type of light, often infrared light, or through a special optical red filter.

A special metameric effect is for example infrared drop-out: the otherwise visible ink cannot be seen in part of the infrared range of the spectrum.

Metameric colours are for example used in EURO banknotes.
Microchip – contact

*Integrated circuit* (microchip) for the storage and processing of data, embedded for example in ID cards. The secure electronic medium contains e.g. the personal data: name, date of birth, place of birth, issuing office and a digitised version of the image of the holder. An ID card with a contact chip must be inserted into a reader to make contact with electrical connectors so that the information can be read from it. The visible parts of the chip module are the typical gold contacts.

See also: [Machine verifiable feature](#)
See also: [Microchip - contactless](#)
Microchip – contactless

A contactless integrated circuit (microchip) is used for the storage and the processing of data, embedded e.g. in passports, ID cards and biometric residence permits. The microchip (not visible in most documents), is connected to an aerial (antenna) which allows communication with the card reader via electromagnetic waves (Radio Frequency Identification (RFID)). To start the transmission, proximity to the reader is required. The protected content of the chip can be read at a distance of 0-10 cm.

Biometric or e-passports incorporate a contactless (or proximity) chip. This chip may be incorporated into the travel document in a variety of ways. The chip may (as illustrated) be embedded within a thick transparent laminate, within the document cover, or within a special polycarbonate page. To maintain data security, often basic access control (BAC) is used (the contactless chip can be read by the relevant reader only once it has been unlocked by a validated PIN code), as well as extended access control - EAC (terminal authentication): as a safeguard, a digital signature (using the ICAO PKI (Public Key Infrastructure) protects the authenticity and integrity of the stored data.

Password Authenticated Connection Establishment (PACE) uses data from the Machine Readable Zone - MRZ for authentication. As an additional optional data element, a Card Access Number (CAN), which is printed on the Visual Inspection Zone (VIZ) of the biodata page, can be used for authentication.
Exception to the rule: Fully visible (under normal light) microchip and antenna

See also: *Machine verifiable feature*
See also: *Microchip – contact*
See also: *Biometric identifier*
Miniprint and microprint

Miniprint and microprint are lines or motifs made up of very small letters or numbers that are barely perceptible to the eye; in documents they often form the guidelines for writing. Miniprint and microprint are also used as security elements of the background/security printing and in security threads.

See also endless text.

- Miniprint may be discerned with the naked eye (but more clearly with magnification).
- Microprint will often require the use of low magnification, e.g. a jeweller’s loupe.

Basic methods of reproduction often do not allow detailed microprinting. Therefore, forged documents will often show unreadable microprint. However, using advanced reproduction techniques it is possible to reproduce miniprint and microprint to a high standard.
Needle perforation

**Needle perforation**: Making holes mechanically (by piercing or punching) in order to incorporate a number or motif into a document.  

- **Serial numbers** are perforated in a regular, matrix-type arrangement of circular, equal-sized holes always pierced in the same direction. Needle perforation is recognisable by the ridges ("burr") that can be felt on the back of the substrate.

Not to be confused with **laser perforation**.

See: **Numbering**
Needle printing

A needle printer or dot-matrix printer is a type of computer printer which prints by impact, striking an ink-soaked cloth ribbon against the substrate, much like a typewriter, but, unlike a typewriter, letters are drawn out of a dot matrix.
Numbering

The following alphanumeric characters are used to indicate the composition of the serial number within the descriptive text:

A: any letter
N: any digit
R: any digit or letter (in a random sequence)

e.g. AA-NNNNN, AAA NNN, AANNNN, or A RRRRRRR. Other letters are used only if they actually appear in every document of the same series (version) – in such cases they are placed in quotation marks, e.g. "Nr EE" NNNNNN:

The serial or document number is a unique number that is printed and / or perforated in a document (or in parts of it); its uniqueness allows a document to be traced, e.g. during the production process and if it is lost or stolen.

Fluorescent serial number
Laser-perforated serial number
Needle perforation
Letterpress printing

Not to be confused with the page numbers printed for example on the inner pages of a booklet document (passport).
Oblique light

**Oblique light**: Light from the side, falling at a shallow angle, which reveals the surface structure of an object through contrasts of light and shade. **Oblique light** is used especially to inspect **embossing stamps**, **intaglio printing**, **latent images** and mechanical erasures.

See also: **Co-axial light**
See also: **Transmitted light**
See also: **UV light**
See also: **Latent image**
See also: **Tilting effect**
Offset printing

*Offset printing* (also called *lithography*, or *wet offset*) is an *indirect printing process* in which text and images are transferred from the plate cylinder (with an even surface) to the offset cylinder (rubber blanket) and from there printed on to the substrate. It is characterised by even inking and precise edge limits.

In security printing, another indirect printing process, *indirect letterpress* (sometimes also called *letterset*, *dry offset*, or *indirect relief*) is widely used. Here laser or photographic processes (e.g. nyloprint® - photopolymer printing plate) are applied to the flexible printing plate, producing a relief surface; only the raised parts get into contact with the rubber blanket. The printed result is very similar to “wet offset” (the characteristic features of *letterpress printing* can not always be seen).

* Rainbow colouring
Optical stripe

An optic stripe is a laser-readable memory device with a storage capacity up to 4 MB. Multiple data files including images can be stored; also visual features, like a micro image, security patterns and an OVD (Optically Variable Device) can be viewed for rapid card authentication.

See also: Machine verifiable feature
See also: Magnetic strip
OVD (Optically Variable Device)

OVDs are security features which show different information, depending on the viewing and/or lighting conditions. This change of appearance is reversible, predictable and reproducible.

We differentiate between the following kinds of OVDs:

1. **Devices with colour changes based on thin layer interference:**
   - OVI: optically variable ink
   - iridescent laminate
   - iridescent ink

2. **Materials/ Structures with variable reflection characteristics:**
   - retroreflective laminate
   - tilting effect

3. **Diffractive Optically Variable Image Devices - DOVIDs:**
   DOVIDs contain gratings (usually in the form of surface reliefs) which modify light by diffraction. Thus different effects like two- or three-dimensional images or kinematic and/or colour-changing effects are created. The different DOVIDs differ in their image resolution, brightness, and their animation capabilities. They are generally known by their trademark names:
   - Hologram
   - Computer generated DOVIDs:
     - Kinegram®, Identigram®,
   - DID® - Diffractive Identification Device,

   *Dot-Matrix-Hologram, Exelgram®, Movigram®(177), Pixelgram®(079), Stereogram®(178).*
OVI (Optically Variable Ink)

**OVI** is a printing ink that contains microscopic pigments acting as interference filters, resulting in large colour shifts (strong variations in colour) depending on the angle of observation or lighting.

OVI is used in **intaglio printing** or in **screen printing**.
Intaglio-printed OVI

OVI
(see the colour change in the example on the right-hand side of this image:)

Screen-printed OVI on the € 50 Banknote

Counterfeit
© Oesterreichische Nationalbank (OenB.at)

Genuine
© Oesterreichische Nationalbank (OenB.at)

See also: ➔ Iridescent ink
PC (polycarbonate)

Polycarbonate (PC) is a thermoplastic polymer. When used as a substrate for documents (e.g. integrated biodata cards in passports, or polycarbonate ID cards), a composition of several layers is fused at high temperature and pressure.

Unlike PVC cards for example, PC cards produce a sound with a metallic ring when dropped on a hard surface.

With PC as a substrate for security documents, a wide range of security features can be integrated, e.g.:

- **background / security printing**
- **Personalisation** by
  - Injet printing colour personalisation inside the multi-layer laminate structure of a polycarbonate card.
  - Laser engraving (black), or e.g.
  - Laser-perforated secondary (ghost) image,
  - Variable laser image and
  - Transparent window.

The surface of PC cards can be tactile:
- Raised (tactile) laser engraving,
- Laminate embossing &
- OVDs (Optically variable devices) can be incorporated.

- Microchip
- Magnetic strip
- Optical stripe can be incorporated.
Photochromic ink

Photochromic inks change their colour when exposed to **UV light**. When the UV light source is removed, the colour change stays for a certain time before the colour reverts to its original state.

Laminate overprint with iridescent, photochromic ink

Not to be confused with: **Iridescent ink**

After exposure to UV light the greenish iridescent overprint stays blue for a certain length of time
Photograph of the holder - fixing methods

- **Photo Patch**
  Fixing method for conventional photos.
• **Glued**
  Fixing method for conventional photos.

• **Eyelets (rivets)**
  Fixing method for conventional photos.
• **Stapled**

Authentication: See also:
- See also: *Embossing stamp*
- See also: *Ink stamp*
- See also: *Relief embossing*

See also: *Biodata / photo / signature integration*
Photographic paper

*Photographic paper*: the paper substrate is coated with light-sensitive chemicals.

(Not to be confused with specially coated printing papers for high-quality inkjet or laser printing (digital photographic) processes, which in everyday language are also referred to as *photographic papers*.)

See: ➤ *Photographic process*
Photographic process

*Photographic process*: Procedures by which light-sensitive materials are made to produce an image on **photographic paper**. A photographic process is a possible integration technique for **biodata / photo / signature integration**.
**Planchettes**

*Planchettes* are small coloured discs incorporated (scattered) in the paper substrate during manufacture. Planchettes are incorporated in a similar way to *coloured security fibres*. Planchettes can also be metallic or transparent; they may also fluoresce under *UV light*, or be made of an iridescent substance showing colour shifts.

See also:
- *Fluorescent planchettes*
- *Coloured security fibres*
- *Fluorescent fibres*
- *Substrate without optical brightener*
PRADO

PRADO (the Council of the European Union's Public Register of Authentic Identity and Travel Documents Online) is a multilingual site with information on authentic identity and travel documents. Document descriptions include technical descriptions - descriptions of some of the most important security features of the document and as a rule also include (indicative) information on the maximum possible validity of the described document, as well as information on its main usage.

Document experts in all EU Member States and in Iceland, Norway and Switzerland provide and select the information to be released to the general public via PRADO. The information originates from the classified Expert FADO system. The steering committee in the Council of the European Union is the Working Party on Frontiers in the formation of False Documents experts.

PRADO is organised and hosted by the General Secretariat of the Council of the EU (GSC), in the Directorate-General for Justice and Home Affairs (in DG D). Technical implementation and maintenance are the responsibility of DG A CIS.

Most of the text entries in PRADO documents are standardised descriptions which are translated automatically into the currently supported 24 official languages of the EU. Thus immediate availability is assured. Free-text descriptions are translated by specialised linguists in the GSC.


Target audience

PRADO targets the general public, including non-governmental organisations, but also governmental organisations, that do not have access to iFADO, including for example:

- Employers
- Postal services
- Banks and credit authorities
- Security companies
- Car-rental agencies

- When examining a document it is important to know its technical details
- PRADO provides easy access to official information on many travel and identity documents
• **PRADO is also available with an optimised screen display for handheld devices.**

**Mission**

The main purpose of **PRADO** is to provide free and reliable information in the Internet to anyone who (is required to) check identities. Identity checking not only takes place at the external borders of the Schengen Agreement Area, but happens regularly in everyday life. **PRADO** is intended to help raise awareness and ascertain the authenticity of documents; doubts can then be followed up by document experts.

**Proceedings**

*Irrespective of a document's origin, questions (including questions on particulars of foreign documents) should be addressed to the respective*

[Identity and Travel Documents – National Contact Point.](#)

Suggestions for improvements or observations on errors and bugs please send to: [helpline.prado@consilium.europa.eu](mailto:helpline.prado@consilium.europa.eu)

Council of the European Union  
General Secretariat  
Directorate General Justice and Home Affairs, Directorate Home Affairs - Unit Schengen, Visas and Borders (DGD 1A)  
Rue de la Loi/Wetstraat 175  
1048 Brussels, Belgium, Europe

See also: [FADO](#)  
See also: [iFADO](#)
Pre-printed text

In a security document, *pre-printed text* is printed on top of the *background / security printing*.

Not to be confused with *biographical / other personalisation text*.

Not to be confused with: *Background / security printing*. 
**PVC (polyvinylchloride) card**

*PVC* - a thermoplastic (*transparent*[^99^]) polymer - is used as a substrate in many documents.

PC (*polycarbonate*) is often preferred for security printing and for card documents requiring high durability (long validity periods).
Rainbow colouring

Rainbow colouring is also called split duct printing. This colouring process used in offset printing is used to protect security documents against colour separation or copying by subtly merging colours into each other, resulting in a gradual colour change.
See also: ➡️ Background / security printing
See also: ➡️ Schablon (stencil) multiple colouring process
Relief embossing

Relief embossing is sometimes also called blind embossing: A colourless embossing of images or text. It involves high-pressure embossing of letters, motifs or other designs.

See also:

- Hot foil stamping
- Embossing stamp
- Laminate embossing
- PC (polycarbonate)
Authentication: See also:
See also: Embossing stamp
See also: Ink stamp
See also: Photograph of the holder - fixing methods
Retroreflective laminate

Retroreflective laminate: An invisible image is incorporated into the laminate, only rendered visible by the use of **co-axial light** using a special viewer or technical equipment.
Schablon (stencil) multiple colouring process

The Schablon (stencil) multiple colouring process - sometimes also referred to as the Orlof (Orlov) process - is used in intaglio printing and enables more than one colour to be printed simultaneously and accurately with one printing plate. A modern printing press can often print several colours (e.g. 3, 4, or 5). The individual colours are applied via individual stencils that match the elements or parts of the required final design. These stencils are also referred to as schablons (or chablons). The inks may overlap to a small extent and in the final printed image a slight colour transition can therefore be seen.
The colour transitions need not, as in *rainbow colouring* (offset printing), run parallel to the direction of the printing process in the printing machine.

See also: *Background / security printing*
Screen printing

**Screen printing** is a printing technique also known as *silk-screen printing* in which the print is produced by the ink being pressed with a so-called doctor blade through the permeable areas of a screen (mesh) on to the substrate below. Screen printing enables a thicker layer of ink to be applied in one operation than any other printing process. Characteristics: Generally dense covering of ink, thick layer; net structure with saw-tooth edges.

In **security printing**, screen printing is mainly used for ➡️ **laminate overprints** or printing of ➡️ **OVI**.

![Screen-printed OVI](image)
Secondary (ghost) image

A **Second (ghost or shadow) facial image** of the document holder can be included on the biodata page or on a second page containing biographical information in the identity document. It can be applied by the same printing process as the primary facial image, or by different processes, e.g. using:

- **fluorescent overprint,**
- **laser perforation,** or an
- **Identigram®.**

See also: **Biodata / photo / signature integration**
Security thread

A security thread is a strip (plastic, metallic, or other material) incorporated in the substrate during manufacture to serve as an additional security feature. A broad range of different security threads exists, from polymer to metal-coated, coloured and micro-printed laminate strips, to highly complex threads which possess machine-readable properties e.g. magnetic or holographic personalised security threads.
The security thread may be completely embedded in the substrate or lie partly on top of it - window-like; then it is sometimes called *windowed security thread*, or *windowed thread*:

See also:  
- Fluorescent security thread
- Endless text
- Biographical / other personalisation text
See-through register

**See-through register:** Images on the front and reverse side are printed in an accurate *front-to-back register*. Designs or partial motifs are seemingly printed at random on the recto and verso of the substrate, but they match up perfectly and form a complete new motif when viewed by *transmitted light*.

Imperfect register in *false documents* will produce a blurred image when viewed by transmitted light.
Serial number

See:  Letterpress printing
See:  Laser-perforated serial number

Serial numbers are in our documents described under the heading Numbering, as the numbering does not necessarily follow a series any more in very many recent security documents.
Stitching thread

See:

 Binding technique,
  Fluorescent stitching thread
Substrate without optical brightener

For synthetic substrates: See under:  ➔ Synthetic fibres.

See also:  ➔ PC (polycarbonate).

Substrate without optical brightener: Security paper (e.g. 25 % to 100 % cotton fibre paper) is used e.g. in passports and for banknotes.

Security paper does not contain optical brighteners and thus appears dark under UV light.

The use of a paper substrate with optical brighteners in passports and other security documents is however also possible (but it is not very common).

Optical brighteners are substances which are incorporated during manufacture into a paper pulp which consists mainly of wood fibres, in order to make the substrate appear whiter. The presence of optical brighteners can be detected by their bluish fluorescence under UV light.
Additional security features include:

- Coloured security fibres
- Planchettes
- Fluorescent fibres

Synthetic fibres

_Synthetic fibres_ are used as a main component in several special _security papers_; they make the substrate highly durable and resistant.

Examples of synthetic printing media:
- Neobond® (e.g. old pink, folded German driving licence).
- Teslin® (as it is commercially available, Teslin® is also often used for counterfeiting ID cards.)

_Synthetic fibres_ are not to be confused with _coloured security fibres_ which do not contribute to the mechanical properties of a substrate.

See also: _Substrate_
Tank tracking - perforation

A method of securing a conventionally fixed (e.g. glued) image of the holder (authentication), applied with a (hand) press in the form of a pattern of lines; between the lines there are often perforated holes.

Authentication methods:
See also: Embossing stamp
See also: Ink stamp
Thermal dye sublimation

**Thermal dye sublimation:** Like *thermal transfer* printers, *sublimation printers* use an ink ribbon. The dye on the foil is heated to a specific temperature at which it evaporates and then diffuses into the substrate. For that diffusion process a specially coated substrate is necessary. Depending on the temperature applied, a varying amount of dye is diffused into the substrate.

This facilitates the production of an image with continuous tone colours. *Thermal dye sublimation* is a possible integration technique for *biodata / photo / signature integration.*
Thermal transfer printing

In *thermal transfer printing*, halftones are generated by rasterisation (screening). The transfer of a homogeneous layer of colour results in dots or areas with sharp edges.

Special ink ribbons, e.g. with metallic pigments, can also be used.

*Thermal transfer printing* is a possible integration technique for **biodata / photo / signature integration**.
Thermochromic ink

*Thermochromic ink* is a special ink that changes colour in a reversible way at different temperatures.
Tilting effect

*Tilting effect:* An image or characters can be seen, or change, when the document is tilted.

(Dynaprint®)

For other special tilting effects see:
- latent image
- laser perforation with tilting effect
- variable laser image

See also:  *Oblique light*
Transmitted light

*Transmitted light* is light shining through the object being viewed (here: page of a document). The object to be viewed is placed between the eye (or camera) and the light source.

See also: [Transparent window](#)
See also: [Watermark](#)
See also: [Co-axial light](#)
See also: [Oblique light](#)
See also: [UV light](#)
Transparent window

The transparent window is incorporated into the substrate during manufacture. When using transmitted light and a magnifying device, e.g. a CLI®, or details of biographical data may become visible.

See also: PC (polycarbonate)
See also: Transmitted light
UV light (ultraviolet light)

*UV light* belongs to the electromagnetic waves at the lower boundary of visible light (200 - 400 nm) - a source of light that is frequently used in document examination to analyse substrate brightness, fluorescent inks and other security features as well as tampering.

Questioned or faded documents can be examined with *UV light* to obtain improved sharpness and resolution. Many inks show a difference in visible fluorescence (*fluorescent ink*). *Fluorescent security fibres* may fluoresce brightly. Additionally, when these fibres are disturbed by erasure by a forger, the difference can be noted under *UV light*.

The main UV sources used in document examination are UV sources with 365/366 nm (long-wave UV), 313 nm (medium wave UV) and 254 nm (short-wave UV) wavelength radiation. Ultraviolet "light" is not visible itself, only its effect, i.e. the visible fluorescence stimulated by UV light can be seen: *fluorescent ink*.

See also: *fluorescent overprint*
See also: Co-axial light
See also: Oblique light
See also: Transmitted light
Variable laser image

A variable laser image is a laser-engraved image with tilting effects, incorporated in plastic cards: images are engraved at different angles through an array of cylindrical lenses embossed into the surface of the card. The image that can be seen changes depending on the angle of view.

Examples:

**CLI ® - Changeable Laser Image**

**MLI ® - Multiple Laser Image**

MLI ®: depending on the angle of view either the serial number or the year of expiry can be seen.
See also:
- Laser engraving,
- Secondary (ghost) image,
- OVD (Optically Variable Device)
A traditional watermark is a picture, text or character design which is produced by pressure on the substrate during manufacture, leading to a varying thickness of the paper. It is sometimes also called Fourdrinier watermark.

The watermark can be observed using transmitted light. Where the substrate is thinner, we can see more light and a clearer image. Where the substrate is thicker we will see a darker image.

As opposed to a printed watermark, the traditional watermark should not appear under UV light.

We distinguish different types of watermarks:

- **Single tone watermark**
  The single-tone watermark can be light or dark.
• **Duotone watermark**

The motif of a *duotone watermark* is both **light** and **dark**.
• Multitone watermark
 Sometimes also called *cylinder mould watermark*. 
The End.

This glossary does NOT provide scientific definitions – its main aim is to help anyone who is not involved in checking security documents on a daily basis to understand some of the more important security features contained in such documents. To this end, simple, non-exhaustive definitions, examples and explanations are provided.

In order to consult the same chapter in a different language version of this document, please look for the corresponding grey three-digit chapter number on the top right-hand side of each chapter.

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