



Empowering Security at the Time of Personalization (S.T.O.P.)



ENTRUST

SECURING A WORLD IN MOTION

OVERVIEW

Evolving threats challenge document security

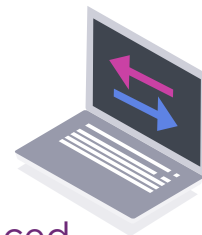
Secure document theft is on the rise, and document alteration and counterfeiting techniques are growing more sophisticated. The challenge of creating and maintaining secure documents is more important than ever. Mitigating these risks and putting trusted credentials in the hands of citizens and government employees requires a new integration of technology and methodology. This end-to-end approach includes security measures to protect the base documents as they are manufactured and transported to the card issuer, as well as new tools to secure the document personalization process.



11 million+
missing/stolen
credentials



Sophisticated
alteration
techniques



Advanced
counterfeiting
technologies

Mitigating risk demands a layered approach

The Entrust layered approach combines overt, covert, and forensic security elements, making credentials easy to authenticate, exceptionally tamper-resistant, and extremely difficult to counterfeit. This methodology binds a secure substrate with unique personalization elements and durable overlays to deliver multi-tiered security.

SECURE OVERLAY

Seal the document with a final layer of tamper-evident and tamper-resistant security with secure overlays – from basic clear to fully customized holographic laminates.

PERSONALIZATION ELEMENTS

Add color-printed and laser-engraved personalization elements that are unique to the document and the bearer.

SUBSTRATE

Create a secure foundation using durable pre-printed substrate with built-in security printing.



Levels of security



LEVEL 1

Overt: Security element is immediately detectable upon examination (visible to the naked eye or tactile).



LEVEL 2

Covert: Security element requires additional training and tools for detection (e.g., UV ink, microprint).



LEVEL 3

Forensic: Security element requires expert analysis using advanced equipment; not generally compatible for in-the-field validation.

Locking in Security at Time of Personalization (S.T.O.P.)



S.T.O.P. features provide issuers with the critical ability to create highly unique security elements using variable cardholder data. This added security makes credentials extremely difficult to replicate and provides crucial tamper-evident features to help mitigate growing fraud risks.

S.T.O.P. features

Entrust provides a wide range of S.T.O.P. elements with a modular approach, enabling document issuers to create an issuance solution that fits their security needs today – and adapts as their card program needs and threats evolve.



INHIBIT ALTERATION:

S.T.O.P. features include variable data that is unique to the document and document-holder, making the credential difficult to alter.



DETER COUNTERFEITING:

S.T.O.P. features require specialized knowledge and technology to replicate, limiting the value of stolen substrate and preventing counterfeiting.



IMPROVE VALIDATION CONFIDENCE:

S.T.O.P. includes overt and covert features that enable easy validation, encouraging inspection by field officers and improving confidence in the validation process.

Building your secure document

1

CONSIDERATIONS

Choosing the right S.T.O.P. features is an essential part of building your secure document program. This decision should include careful consideration of your organization's unique needs, including:

- Level of security: Where will the document be used? What security threats is it designed to mitigate, and what counterfeit/alteration risks will it face?
- Amount of inspection training time required: Some advanced personalization features require more intensive inspection training.
- Budget: Optimize the level of security that fits within your budget.

2

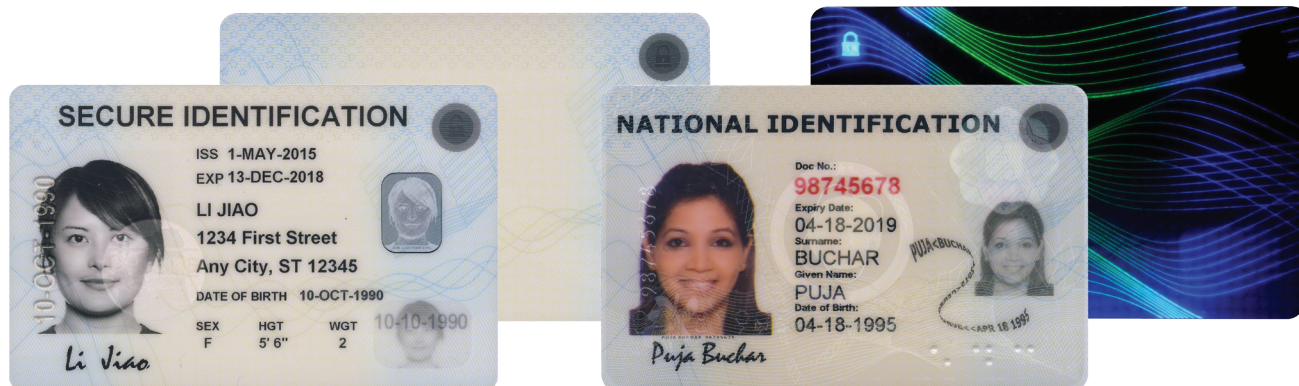
MULTI-LAYERING

Depending on your program needs, Entrust can layer laser engraving and color printing personalization elements to create the right level of security.

3

EXPERT GUIDANCE

There is no magic number of personalization elements for a secure document. Fortunately, Entrust provides expert guidance in helping you select the right elements for your program. Our consultative approach draws on decades of experience creating passport, driver's license, national ID, and other secure ID programs for governments around the globe. We produce some of the most secure documents in the world, and we are ready to apply that proven knowledge to help you create a secure, reliable, and cost-effective document program.



Sophisticated laser personalization technologies

Laser personalization: Passports and ID cards

WHAT IS IT?

A laser personalizes text, photos, and other biographical elements beneath the surface of the document substrate. The polycarbonate molecules are hit by a focused laser beam, converting them to small, black carbon bubbles, forming text and graphic elements. Varying the amount of laser energy enables true gray-scale, photo-quality monochrome images.

ADVANTAGES:

- Exceptional tamper-resistance: Personalized elements are extremely difficult to remove, alter, or replicate.
- Outstanding durability: Laser-personalized elements do not fade easily and are not subject to deterioration from UV light, moisture, or surface abrasion.
- Economical & reliable operations: The built-in durability of laser and polycarbonate documents eliminates the need for durability add-ons, decreasing cost-per-card. Laser personalization uses no print ribbons or overlays – a simplified process that delivers reliable performance.

TYPICAL APPLICATIONS: The high degree of tamper-resistance and long lifespan make laser personalization a popular choice for high-security documents including passports, national IDs, driver's licenses, and government employee IDs.



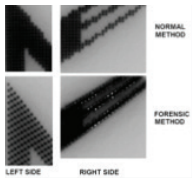
Laser S.T.O.P. features



PERSOCURVE™

Level 1 & 2

Personalization data – including variable large fonts, microprint, and biographical data – is printed in a customized shape (“curve”). The unique shape, font sizes, and patterns are extremely difficult to reproduce or counterfeit – but easily visually identified at time of validation. Entrust software completely transforms the normally time-consuming “curve” creation process. Simple, one-time configuration creates a customized “curve” – anything from a simple wave to a complex spiral – and determines placement on the card. From there on, the Datacard issuance system creates each unique PersoCurve on the fly during the job run – dramatically speeding production and reducing cost.



FORENSIC PERSOCURVE™

LEVEL 1, 2, & 3

Forensic PersoCurve builds on the security of PersoCurve by either warping the arrangement of data or manipulating pixel density in ways that make the printed element even more difficult to counterfeit. By combining dot pitch and laser pixel path variations with normal PersoCurve, various subtle (but forensically identifiable) changes in appearance and tactility can be achieved within a single engraved element.



LASERTACT™

Level 1

LaserTact goes beyond standard laser tactile engraving, creating a wider and more prominent impression and color hue of variable biographical data and static images/symbols. The feature is also unique in that it is only faintly colored, resembling embossed characters on a financial card. The LaserTact feature is difficult to replicate without specialized knowledge and technology, provides tamper-evident security, and can be easily verified through visual and tactile examination.



LASER MICROPRINT

Level 2

Creates small text that appears as a continuous line to the naked eye and can only be read using a magnification device. Cannot be reproduced with conventional printers/copiers. A core security feature in a majority of government identity programs.



LASER ABLATION

Level 1

Laser ablation creates a high-resolution, foil image that matches the primary photograph on the ID, and it's embedded in a clear window that is an integrated part of the card's construction. The feature personalizes variable images and biographical data using a subtractive laser-ablation process, enhancing the overall security of the finished card. The laser also ablates microprint text over the photo for an additional element of security. This provides a strong defense against the triple threats: counterfeiting, tampering, and impersonation.



(MLSI) MICRO LASER SURFACE IMAGING ON POLYCARBONATE

Level 1

The Micro Laser Surface Imaging™ (MLSI) feature is created on a variety of plastic materials including polycarbonate and optical variable devices (OVD) in the substrates by heating the materials with a precisely controlled laser. The process produces a range of effects, from nearly undetectable surface ripples to very small bumps, which have different surface reflective properties than the unprocessed area surrounding the personalized image.



(MLSI) MICRO LASER SURFACE IMAGING ON PAPER

Level 1

This feature is created on the passport's thin film overlay by heating the materials with a precisely controlled laser. The process produces a range of effects, from nearly undetectable surface ripples to very small bumps, which have different surface reflective properties than the unprocessed area surrounding the personalized image.



CONICAL AND SHAPE LASER PERFORATION

Level 1

The Passport Perforation Module uses class IV Laser technology to perforate a series of dot matrix characters through a passport book — providing a security feature that is present on the inner pages of the book and back cover, excluding front cover and any number of opened pages after the cover. Both round and shaped perforations can be accomplished with this feature.



LASERSHADOW™

Level 1

Laser engraving technology creates large backgrounds of variable text or images that overlap other personalized data fields. Features are easily identified upon visual inspection but cannot be replicated by standard laser printers.



LASERSHADOW WITH MICROPRINT

Level 1 & 2

Laser engraving creates small text appearing as a continuous line embedded within the LaserShadow image. The text is visible to the naked eye but not fully legible without closer inspection.



TACTILE LASER ENGRAVING

Level 2

Laser engraving is applied in a unique manner to create a raised card surface with tactile effect for signatures and text. Not visible to the naked eye, but easily detectable upon inspection.



MULTIPLE LASER IMAGE (MLI)/CHANGEABLE LASER IMAGE (CLI)

Level 1/2

Laser engraving applies multiple, overlapping images and text to a credential, creating a lenticular lens that makes photos appear to change when viewed from different angles. This feature is readily visible upon inspection and cannot be replicated with other imaging technologies.



Original

PHOTO OPTIMIZATION

Level 1

Proprietary software dynamically evaluates each image and applies appropriate corrective action to enhance photo quality and consistency. This image enhancement is fully automatic – no data prep or operator efforts required – and can address a wide range of photo quality issues. Sharper, clearer photos provide better Level 1 security, making counterfeits and alterations easier to spot and improving visual validation at time of use.



Optimized

Vibrant color printing technologies for ID cards

Dye sublimation direct-to-card ID cards

WHAT IS IT?

Direct-to-card printing – also known as D2T2 printing – uses a thermal printhead that brings three-color (Y, M, C) dye ribbons in direct contact with the card. As the most common process for full-color card personalization, D2T2 printing enables the addition of logo, cardholder photo, or other graphical elements to pre-printed cards – or start from scratch and turn blank white cards into colorful, branded, high-impact cards – all in full color with near-edge-to-edge coverage.



ADVANTAGES

- Exceptional consistency: Reliable performance delivers high-quality cards in vibrant color, again and again.
- Flexible integration: Direct-to-card technology is designed to fit with a wide variety of Entrust systems.
- Highly cost-effective: Low-cost supplies and high throughput deliver outstanding cost-per-card.

TYPICAL APPLICATIONS: Frequently used for driver's licenses, national IDs, and other ID cards featuring a cardholder photo. Typically available in 300 dpi using three- or four-color monochrome or paneled print ribbons. Dyes must be protected with an overlay or laminate to prevent image degradation.

Color S.T.O.P. features



UV PRINTING

Level 2 | ID Cards

Variable UV fluorescent printing of text, photos, or images is only visible under UV lighting, creating an effective Level 2 security feature. This helps prevent alteration, as the technology is not easily available to counterfeiters.

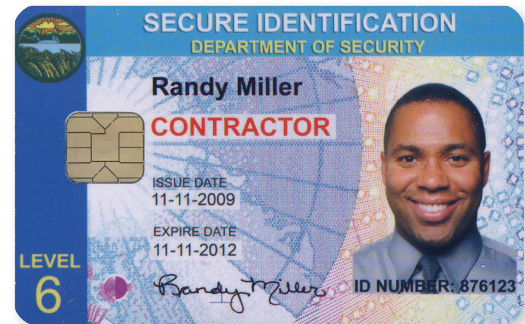
Vibrant color printing technologies for ID cards (continued)

Dye and pigment and retransfer printing – ID cards

WHAT IS IT?

Dye retransfer: Also known as D2T2 retransfer printing, retransfer technology prints separate layers of cyan, magenta, yellow, and black on transparent retransfer material, then transfers the composite image to a card. This process allows for full over-the-edge imaging.

Pigment retransfer: Pigment inks can also be applied using the same retransfer technology as dye sublimation retransfer printing. In this process, images are thermally printed to a carrier and are retransferred to the substrate.



GENERAL RETRANSFER ADVANTAGES (DYE & PIGMENT)

- Lifelike images: Up to 600 dpi printing produces exceptionally high-quality images with true over-the-edge coverage
- Flexible card options: Print on a wide range of card types, including PVC and polycarbonate cards
- Maintains exceptional image quality over irregular surfaces, such as embedded smart chips

PIGMENT RETRANSFER ADVANTAGES

- Exceptionally resistant to fading from UV light – thermally applied pigment inks are more stable than typical dyes
- Fast, reliable, and consistent imaging process
- Unique metallic gold and silver spot color printing using specialty printheads

TYPICAL APPLICATIONS: Frequently used for smart card issuance because it easily accommodates irregularities in the card surface, such as the contact chip.

Vibrant color printing technologies for passports

Inkjet passports

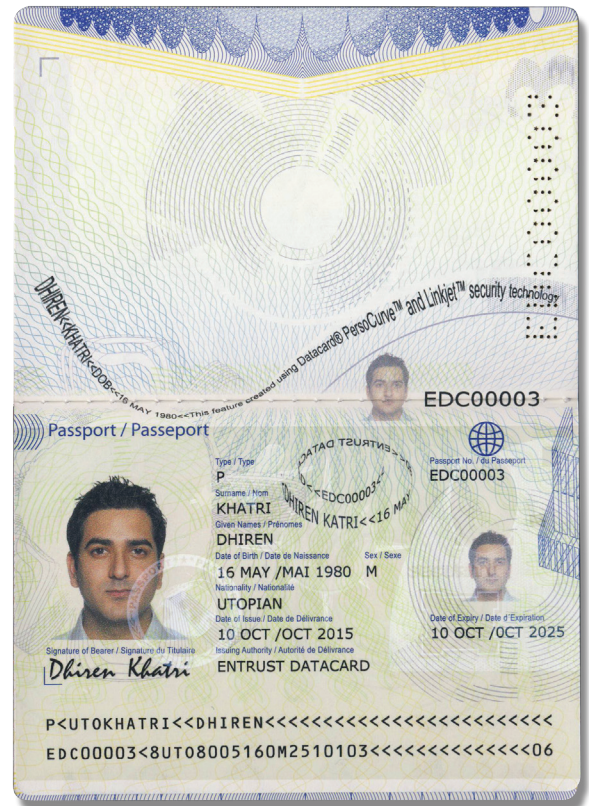
WHAT IS IT?

Inkjet technology prints thousands of tiny ink dots, creating text, images, and other graphic elements in a “dot matrix.” Inkjet printing is the most common technology for commercial printing of secure and non-secure documents. However, advances in inkjet technology have dramatically improved the quality, durability, throughput, and cost over previous-generation toner-based electro-photographic systems.

ADVANTAGES

- Crisp imagery and sharp contrasts: The fine dots of inkjet printing create exceptionally crisp images and graphic elements with sharp contrast.
- Tamper-evident printing: Inkjet-printing images and text permeate into the document, making alteration extremely difficult without clear tamper evidence.
- Low cost, high yield: Inkjet printing hardware and supplies are significantly less expensive than their toner-based counterparts. The inkjet printing process delivers reliably high throughput, driving operational efficiency and reducing cost-per-book.

TYPICAL APPLICATIONS: Inkjet printing is ideal for high- or low-volume passport production, balancing security and tamper-evidence with cost-effective operations.



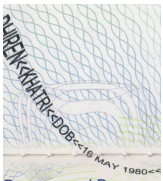
Inkjet S.T.O.P. features



PERSOCURVE™

Level 1 & 2 | Passports

Personalization data – including variable large fonts, microprint, and biographical data – is printed in a customized shape (“curve”). The unique shape, font sizes, and patterns are extremely difficult to reproduce or counterfeit – but easily visually identified at time of validation. Entrust software completely transforms the normally time-consuming “curve” creation process. Simple, one-time configuration creates a customized “curve” – anything from a simple wave to a complex spiral – and determines placement on the card. From there on, the Datacard issuance system creates each unique PersoCurve on the fly during the job run – dramatically speeding production and reducing cost.



LINKJET™

Level 1 & 2 | Passports

This Entrust-exclusive technology enables printing of images or text seamlessly across the center open spine of a passport booklet. InkJet integrates with a high-speed personalization environment to ensure consistent, high throughput. This capability is extremely difficult to replicate and provides fast visual identification, making it easy to spot counterfeits or alterations. InkJet can be combined with other Entrust personalization elements, such as UV printing or PersoCurve, to further elevate security.

Tactile personalization technology

WHAT IS IT?

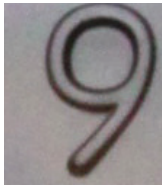
Tactile printing technologies allow card issuers to add a tangible security element during the personalization process. These Level 1 security features offer a range of benefits from protecting against fraudsters to helping the visually impaired read data on their credentials. Adding tactile elements to IDs can also be a cost-effective way to achieve a stronger credential.

ADVANTAGES

- Provides a visible, tangible layer of security: Card authenticators can quickly see and feel the raised components of tactile printed elements, improving card validation.
- Protects against tamper evidence: The Entrust tactile impression feature offers tamper-evident resistance to counterfeiters attempting to remove card overlays to access sensitive personalization data.
- Cost-effective security measure: Adding tactile elements is a relatively low cost way to bolster card security.

TYPICAL APPLICATIONS: Tactile features are used throughout government ID programs, from national IDs to driver's licenses and high-assurance employee IDs.

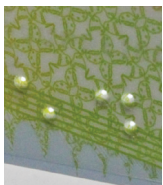
Tactile S.T.O.P. features



SECURE INDENT

Level 1/2

Variable indenting remains one of the most cost-effective, tried-and-true card security features. A recess is created in the card surface that cannot be altered and is more difficult to replicate than straight-line indenting. Variable indenting can accommodate customized characters, symbols, or elements and variable personalization data that is easy to visually verify. Overlapping indent with photo further deters alteration. Secure indent can be elevated to a Level 2 security feature with overt micropatterns (including deliberate error) that can only be seen under magnification.

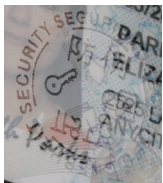


EMBOSSSED BRAILLE

Level 1

Variable embossed Braille characters leave permanent raised marks on the card surface, allowing visually impaired citizens to read cards and providing a Level 1 tactile security feature. Embossed characters cannot be easily removed or altered without clear tamper-evidence.

Tactile static feature



TACTILE IMPRESSION

Level 1

This proprietary Entrust feature uses heat and pressure to produce a static, generic, or custom impression on the card laminate and substrate. Tactile impression provides a simple and cost-effective solution for adding Level 1 security, requiring no special inspection devices. The impression visibly alters the card and laminate, making tampering attempts highly evident.

Expert guidance from a trusted partner

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ABOUT ENTRUST CORPORATION

Entrust keeps the world moving safely by enabling trusted identities, payments, and data protection. Today more than ever, people demand seamless, secure experiences, whether they're crossing borders, making a purchase, accessing e-government services, or logging into corporate networks. Entrust offers an unmatched breadth of digital security and credential issuance solutions at the very heart of all these interactions. With more than 2,500 colleagues, a network of global partners, and customers in over 150 countries, it's no wonder the world's most entrusted organizations trust us.

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