

DatacardGroup

SECURE ID AND CARD PERSONALIZATION SOLUTIONS

Card Security and Durability Supplies for Printed Cards



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Introduction

What is a Secure ID?

The ID badge visually verifies that a person is allowed to be in a company facility - or it may also be used as ID which allows a "visitor" entry to another organization's building. The digital ID card systems sold for the past several years provide ID's that are more tamper evident than the previous laminate/film based IDs. However, the popularity and low price of ID systems has created the ability for anyone to recreate an exact duplicate of any organization's badge. A duplicated badge doesn't necessarily open doors, but it is a problem, as "visual" identity is a big piece of an overall security plan.

Datacard Group offers custom security supplies that are unique to your organization and cannot be purchased by anyone else. These secure solutions combine a range of overt and covert features that provide 1st and 2nd level card security, making duplication more difficult, if not impossible, as well as making it easy to identify forged cards.

Protect the quality, security and extend the life of printed plastic cards.

Most Datacard[®] card personalization systems feature thermal printing capabilities which are used to print photos, text, logos, bar codes and other graphic elements on plastic cards. These personalized plastic cards are regularly exposed to a variety of potentially destructive elements that can degrade printed images. Datacard offers a full range of card protection alternatives that can provide effective protection against these threats.

Chemical Attack: The plasticizers used to construct vinyl pouches found in most wallets can penetrate a card surface and extract the dyes used to print photos and other images. The same holds true for skin oils, certain cosmetics, and leather treatment chemicals.

Abrasions: Repeated swipes through a card reader can remove printed images from a plastic card, especially if the card has no topcoat or laminate protecting the printed image.

Moisture: Humidity, perspiration, and other moisture can attack or weaken adhesion of poor quality topcoats and cause premature image failures. Even IDs kept in wallets are exposed to high levels of perspiration and moisture.

Ultraviolet Light: Prolonged exposure to sunlight and other UV sources can fade printed images on plastic cards and can also degrade a card's protective layers.

Choose the Datacard[®] supplies that best suit your card application.

Datacard offers a broad range of card protection alternatives, including clear topcoats, security topcoats, Datacard[®] DuraGard[®] clear laminates and DuraGard[®] secure laminates which contain high resolution holographic security images and advanced security OVDs. These alternatives offer unique levels of protection that can be matched to your application needs. In addition, Datacard solutions may be used individually or in combination to preserve printed images and extend the life of personalized cards.

Card Durability Supplies

There are a number of card durability supplies available. These supplies protect printed cards from the destructive elements they are exposed to daily.

Durability supplies can also be combined with the security offerings to increase both the security and durability of a printed card. Exclusive Datacard formulations make Datacard Certified Supplies more flexible, resilient, and superior in adhesion to the card than other competitive products within the market.

Datacard® DuraGard® Laminates

DuraGard® laminates were developed specifically for national ID and driver's license programs requiring extended card life. They provide the best chemical and abrasion protection offered by Datacard. DuraGard laminates, when applied to composite cards, meet or exceed most bid specifications for abrasion and chemical durability.

DuraGard laminate is a thick polyester laminate that incorporates a heat-activated bonding layer and is designed to be applied inline within the card personalization printer. This module accurately places the DuraGard laminate onto the card, tacks it in place, and then applies uniform heat and pressure, ensuring a strong bond.

DuraGard laminates can be applied over composite cards that have been personalized with graphics, dye diffusion and thermal transfer imaged photos and pictures. Because of the thickness of the DuraGard laminate and the requirement for composite cards, it is not recommended that the cards be embossed. If the DuraGard laminate is applied to composite cards and subsequently embossed, the results will not meet the ISO standards for character height. Additionally, the laminate may not adhere to the card in the embossed area.

Note: Composite cards are defined as a multi-layered plastic card with at least 20% polyester core and a top and bottom layer of PVC. Applying Datacard® DuraGard® laminates to plastic cards other than composite cards may result in unsatisfactory card warping when subjected to high temperature/humidity conditions.

Typical Applications: Government ID, Driver's License, Healthcare, Corporate, College and University ID

Topcoat

The clear topcoat is a protective layer applied over the face of the card. The topcoat resin bonds to the surface of the card and protects bar codes, signatures, variable text, logos, and images from abrasions and chemical attack. Clear topcoat is 3 – 4 microns thick and available in either a full card, edge-to-edge product offering or as the in-line T-panel for the Datacard® ImageCard® series card printers.

Typical Applications: Patron Cards, Voter ID, Health Club Cards, Theme Park Cards

Card Security Technologies

All Datacard topcoat and DuraGard laminate supplies can be customized to include security features that meet the unique needs of any card program. These optically variable devices (OVDs) can be separated into one of two categories:

- **Covert Features:** Security features that are embedded in the supply item that require secondary instruments in order to be viewed (i.e. Magnification, UV lights, optics). Examples include microtext printing, ultraviolet printing, laser-retrievable text, and others.
- **Overt Features:** Security features that are observable to the naked eye without the aid of any secondary devices. Examples of overt security features include holograms, guilloche patterns, mica printing, and kinetic patterns.

There are only a few manufacturers in the world that can produce an OVD. The process is very complex, making OVD creation and material production unique for each customer. When a topcoat or laminate is applied to a printed card, it becomes difficult, if not impossible, for someone to change the information on the printed card without destroying the OVD image. Once the OVD image is destroyed or removed, it is evident that the card is a forgery or that the information on the card may have been altered.

Holograms

The most popular optically variable device is the hologram. Holograms are light diffracting images that exhibit dimensional characteristics. The holographic image is a two- or three-dimensional design that is typically custom-made to a customer's design requirements using their artwork or logo. When a hologram is turned or looked at from a variety of angles, the holographic image appears to move or change as light diffracts across the image.

Holograms are best viewed in sunlight, or with a spot light or single incandescent bulb. Diffused lights, such as a large fluorescent panel or cloudy sky, do not show holographic images well.

There are three types of holograms available:

Two-Dimensional Hologram

A two-dimensional hologram is visible only on the surface of the card – just like text on a page. These holograms are characterized by their high visibility, good image clarity and fine detail. They are the easiest type of hologram to make and generally the least expensive.

Three-Dimensional Hologram

Three-dimensional holograms have depth. In other words, the image appears to be above and/or below the plane of the card. While the added depth creates an interesting visual effect, the viewing angle and image clarity are greatly reduced. 3D holograms are the most expensive type of holograms to create. This process is not recommended for transparent imagery (such as application on to ID cards).

2D/3D Hologram

This type of hologram combines the best of the two previous forms of imagery. The image consists of a number of planes, each of which contains a certain piece of information. Linking these different planes produces a spatial effect. A foreground, mid-ground or/and background effect can be achieved depending on the positioning in the hologram. The main information, which is to be shown most strongly, is called the image plane.

Card Security Technologies (continued)

Guilloche Patterns

Another popular optically variable device is a guilloche pattern. A guilloche pattern combines complex line detail in an animated wave pattern. A custom guilloche OVD can be used alone, but is typically combined with a holographic OVD. While a guilloche OVD refracts light in the same manner as a hologram, it offers a substantially higher level of security and complexity. While guilloche OVDs are typically used in currency and passport programs where a unique custom design is created exclusively for each program, more and more card programs are starting to include guilloche OVD patterns as an added level of security.

Mica Ink Printing

Mica ink is a transparent ink that contains microscopic mica flakes. Information printed in mica ink will appear transparent at one viewing angle and then “shift” to a customized color at another viewing angle. This printing can be personalized to the customer’s requirements and is visible in all forms of light. Formats can be as simple as a design across the card or as detailed as printed words or designs.

Kinetic Patterns

Kinetic patterns are similar to guilloche patterns, but instead of being animated waves, the patterns are a series of complex, straight lines or shapes. As the viewing angle of the card is changed, the kinetic image moves across the card, giving it the effect of motion across the card. Like a guilloche OVD, patterns are customized for each program and are typically combined with a holographic OVD, a guilloche OVD, or both.

Micro Printing

Micro printing is high-resolution holographic imagery that exceeds 1,200 dots per inch (dpi) and is only identified by using a handheld magnification device or microscope. Micro printing or micro graphics are hidden within the refractive structure of the holographic OVD image during the origination process. Typical information printed in micro printing can be as simple as a company or country name or as complicated as important text and names. For example, The Declaration of Independence is printed several times in select areas on currency printed in the United States.

Ultraviolet Ink Printing

Under normal light, ultraviolet (UV) printing appears clear and is hardly noticeable. However, when viewed under a simple black light, the UV printed pattern will fluoresce in one of four different colors. The information can be customized to meet any customer’s requirements. When combined with mica ink, UV ink creates an even greater effect because a color shift is visible under normal light and a color change is visible under black light.

Laser-Retrieveable Covert Text

Laser-retrieveable covert text is a security feature that is embedded into a custom hologram OVD or custom guilloche OVD. Under normal light, the holographic or guilloche patterns are only visible. However, when a standard red laser pen illuminates a specified portion of the OVD, a text message is reflected from the card. The text

message is limited to a few characters or simple imagery and is typically unique to each card program.

Designing a Custom DuraGard Security Laminate or Topcoat

It is important to keep card design requirements and environmental considerations in mind when making decisions about card protection and durability alternatives. For example, Datacard recommends a protective coating for virtually every application containing color photos. We also suggest that personalization should be kept away from card edges and other wear-prone areas ---such as areas directly corresponding with the magnetic stripe on the opposite side of the card. Consult your Datacard sales representative to ensure you make the best decisions for your card issuance program.

Please consider the following when thinking about your custom OVD design:

- ◆ Simple bold patterns work best, giving the brightest appearance on the printed card
- ◆ Using all capital letters for text creates a strong image
- ◆ Simple dark cards intensify the OVD effect, while faint colored cards tend to subdue the holographic image.

When submitting artwork, please consider the following:

- ◆ Datacard currently utilizes Adobe® Photoshop® and CorelDraw® for viewing and modifying images
- ◆ Vector, .tif, and bitmap files can also be submitted for viewing images
- ◆ Camera-ready artwork is also acceptable to begin creating images

Custom Order Forms can be downloaded from PartnerPage™ (www.partnerpage.com). They can be filled out electronically or by hand and returned to Datacard to begin the custom origination process.

Artwork Originations

There are many different types of artwork originations. Each differs based on the type of logo or artwork used and the level of security required by the card program.

Mechanical Origination

A mechanical origination is an embossed image that simulates the prismatic effects found in two-dimensional hologram, but with fewer data points. These images have fewer colors and diffractive elements. Because of their simplicity, mechanical images are easy to copy by many manufacturers throughout the world, making them a good option for low-security card programs.



High-Resolution Origination

These computer-generated OVDs are exponentially more complex than mechanically originated images. Datacard offers highly evolved effects such as kinetic movement, channeling and morphing - all which incorporate 1.69×10^6 digitized data points, each created by manipulating 1536 variables. As a



Designing a Custom DuraGard Security Laminate or Topcoat (continued)

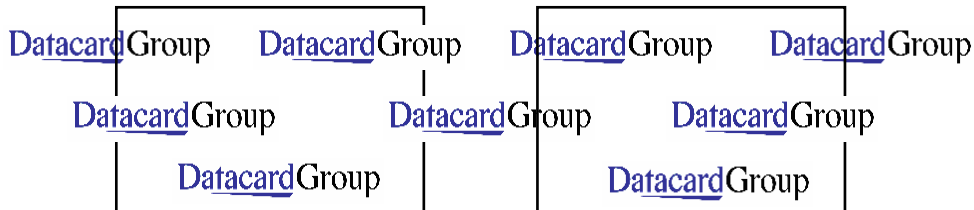
result, these high-resolution images cannot be copied or re-originated with commercially available optical scanning techniques and may require a proprietary device to identify specific security feature. Most OVD offered by Datacard require a high-resolution origination.

Image Orientation

OVD images can appear upon the card in several different ways, depending on the type of origination required or the OVD selected. Image orientation is not dependent on whether the origination is mechanical or high-resolution.

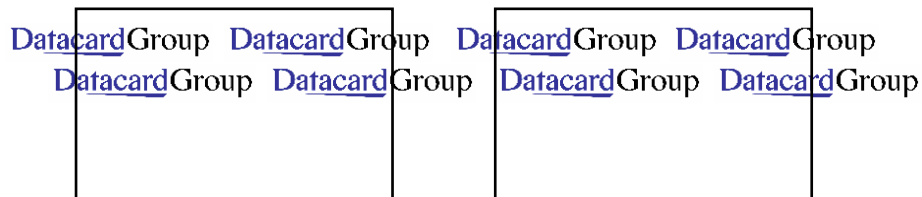
Random OVD Images

Random OVD images appear randomly across the card, making each card look a bit different from the next. This type of layout is available in topcoat and DuraGard Laminate.



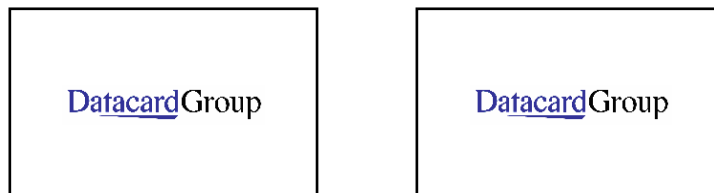
Lane Registered Holographic Images

Lane registered holographic images appear in the same general location across the card, leaving part of the card without holographic images. This is ideal for printed cards with bar codes. This type of layout is available in topcoat and DuraGard Laminate.



Registered Holographic Images

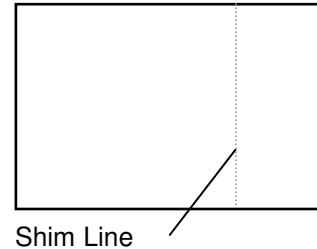
Registered holographic images appear in the same exact location on every card, making all cards look identical. Since each card has the same appearance, forgery and counterfeiting is difficult, if not impossible. Knowing that all cards will look the same also simplifies the inspection of a card when it is used.



Designing a Custom DuraGard Security Laminate or Topcoat (continued)

Shim Lines

Artwork images are embossed into a topcoat or DuraGard laminate through the use of a tooling belt or shim. The shim is constructed from one flat belt that is welded together for automated production. This weld creates what is known as a “shim line.” As part of the production process, shim lines are transferred into the topcoat or DuraGard Laminate whenever the edge of the shim contacts the polyester film. These lines will occur every 6 to 32 inches, depending on the supply item, tooling used, and customer’s artwork. This means that a shim line may appear on one of every twelve cards or as often as every other card.



The presence of these lines does not cause a performance problem in the material or the printed card. The only issue is one of aesthetics and customer acceptance.

To eliminate the presence of shim lines, Datacard recommends the use registered artwork originations. When a registered origination is used, shim lines appear in between the used material, and not within the material that is used on the card. This means that customers will never have a printed card that contains a shim line because the shim lines appear in the take-up materials.

Card Construction Compatibility Notes

For the best results, Datacard recommends the following cards and card constructions be used in all card personalization programs using topcoat or DuraGard laminate:

- PVC or PVC-surfaced “graphics-quality” cards
- PVC-only cards are very susceptible to stress hardening, designed for shorter card life applications.
- PVC-PET composite cards are highly recommended for heavy use card applications with a desired nominal card life greater than 18 months.
- Heavy use five-year PVC-PET cards should withstand 25,000 flexes, 5+ lb./in peel strength, 48+ hour chemical stress hardening, 0% static stress failure.
- For nominal card life exceeding five years, seek 100,000 flex and 7+ lb/in peel strength qualified cards.

If you have questions regarding the cards you are using or are planning to use in a card program, please work with your Datacard sales representative to identify the results you can expect when using any security or durability product.

Datacard Supply Offering

Datacard offers a complete line of durability and security solutions for photo ID and plastic card programs. With these innovative technologies – all of which can be applied inline as part of the card personalization process – you can select the features that match your program's priorities and security needs. Plus, these solutions offer a simple, cost-effective way to extend the life of cards and minimize the frequency and cost of re-issuance.

Datacard® DuraGard® Optigram® Laminate

The ultimate in photo ID and card protection. This technologically advanced laminate incorporated several highly sophisticated optical variable devices (OVD's). Optigram laminates can combine all of these features, or select elements, depending on the security needs of the program.

- Guilloche Patterns
- Holograms
- Laser retrievable covert text
- SecureText™ micro-printing

Datacard® DuraGard® Holographic Laminate

DuraGard holographic laminate includes an embedded hologram which is completely customizable, and typically includes state or national flags, government seals, or agency artwork. Regardless of the image, it is virtually impossible to alter the card without destroying the hologram, making forgery attempts easy to recognize.

Datacard® DuraGard® Secureprint Laminate

This laminate offers the same strong resistance as other DuraGard laminates, and is customizable for smaller card programs. Secureprint laminate combines a customizable area for logos or text with a standardized holographic image for a cost-effective approach to enhanced card security.

Datacard® DuraGard® Clear Laminate

Clear laminates provide the strongest defense against abrasions, chemicals, and moisture. The thick polyester patch is specifically formulated to prolong the life of national IDs, driver's licenses, and other identification cards.

Clear and Holographic Topcoat

Topcoat is an edge-to-edge protective layer that protects the card surface from abrasions and chemical reactions. Topcoat is available in clear and can be combined with a custom hologram or Optigram laminate features to improve security.

Printer and System Usage

Datacard offers a number of card printers and card issuance systems that offer different levels of security and durability supplies.

Printer/System	Topcoat			DuraGard Laminates*		
	Clear	Random Artwork	Registered Artwork	Clear	Random Artwork	Registered Artwork
SP75 Card Printer	✓	✓	✓	✓	✓	✓
ImageCard® IV Card Printer	✓	✓		✓	✓	✓
ImageCard® Magna™ Class Card Printer	✓	✓		✓	✓	✓
Magna™ Class Card Printer with Advanced Imaging Technology™	✓	✓		✓	✓	✓
Magna™ Platinum™ Series Card Printer	✓	✓		✓	✓	✓
9000/7000 Series System	✓	✓	✓	✓	✓	✓

- * DuraGard Laminates include:
- 0.5 mil and 1.0 mil clear laminate
 - 0.6 mil and 1.0 mil security laminate
 - Secureprint laminate
 - Optigram laminate

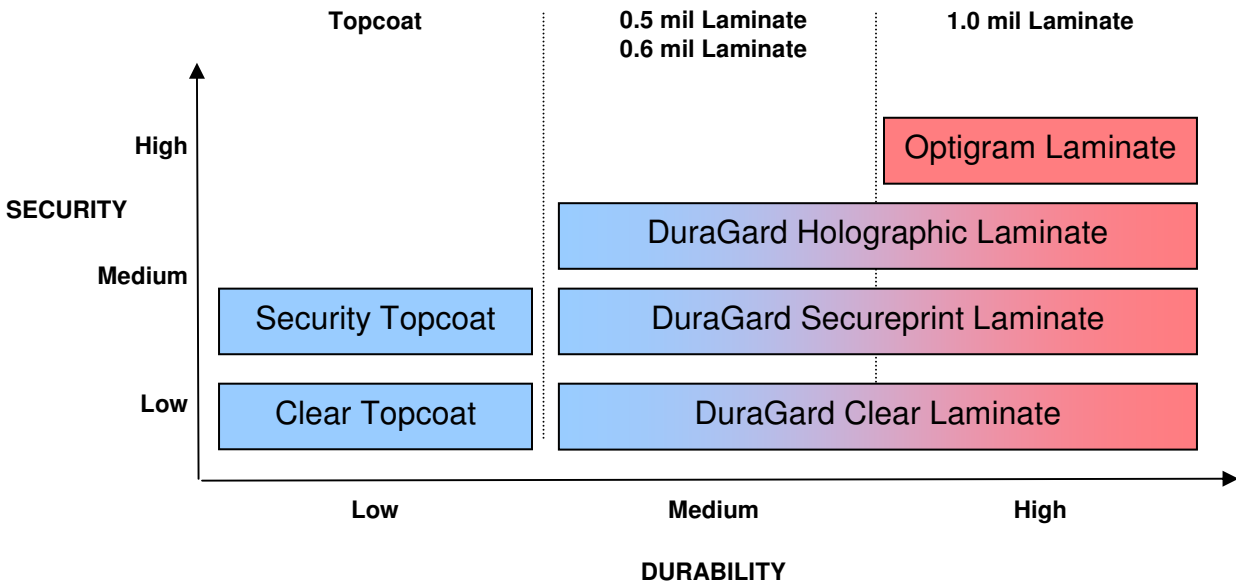
Card Life Expectations

The most commonly asked question regarding card durability is “What card life can I expect when using this supply?” Unfortunately, this is also the most difficult question to answer. Even though the card is only designed to perform a specific task (i.e. personal identification, building access, etc) it is also in contact with contaminants and situations which can limit the life of the card.

- ◆ Cards used for tasks outside their original design
 - Cleaning ice from an automotive windshield
 - Opening a locked door when the key is lost
- ◆ Cards left in severe conditions for extended periods
 - Leaving the card on an automobile dashboard
 - Accidentally washing a card in the washing machine

Finally, cards are exposed to a number of these extreme conditions over the card life, which can further contribute to shorter lives.

An expectation of card life must be established in order to ensure that the proper durability offering and card construction is specified in a particular application and that the proper customer expectation has been set. Generally, the following performance characteristics can be expected from the Datacard security and durability product offerings when used in conjunction with the proper card constructions as noted above:



Marketing and Sales Tools

Datacard offers a variety of marketing and sales tools to support the sale of security and durability supplies. All are available through PartnerPageSM (www.partnerpage.com). Materials include datasheets, bid specifications, brochures, order forms, sales information, and more.

Please contact your sales manager or sales support representative for more information on Datacard Certified Supplies.

Frequently Asked Questions

Why do some security supplies have a vertical line through the material?

The faint vertical line is called a shim line and it is a natural part of the material production process. The line is actually caused by the point at which the manufacturing tooling is welded together; this weld is embossed into the material during the same embossing process that personalizes supplies to a particular program.

In some supplies, like DuraGard laminate with random security images or random security topcoat, this line can not be prevented or minimized, and it will periodically appear on printed cards. However, if security supplies with registered security images are ordered, the shim line can be positioned so it will not appear on printed cards.

Can a clear or security topcoat be applied on a smart card?

Datacard only recommends a topcoat for use in contactless smart card applications. If topcoat is used in a contacted smart card application, the topcoat will be applied over the smart card chip, producing a card that customers will likely object to. DuraGard laminates are provided with a smart card window for use in these applications.

Can printed cards with a DuraGard laminate be embossed?

We do not recommend embossing when using DuraGard laminates. Embossing the DuraGard laminate will result in cards that will not meet ISO standards and may lead to adhesion failures.

Can a DuraGard laminate be applied on a smart card?

For smart card applications, a special die-cut DuraGard laminate is available which leaves the smart card chip exposed.

Why do different printers use different DuraGard laminates?

While many printers use the same DuraGard laminate material, some printers require different part numbers. The DuraGard laminate material is identical, but typically the core, yield, laminate size, or index marks differ, requiring different part numbers.