TECHNOLOGY COMPARISON

Comparing Card Printing Methods: Direct-to-Card versus Reverse Transfer

Introduction

Organizations seeking to produce quality printed cards and IDs will find an array of card printers from which to choose. Understanding that not all print technologies are equal — and the basics of how they work — is essential to selecting the right solution.

This technology comparison will allow you to explore the differences and potential advantages of one printing method over another dependent on your specific needs and preferences.

This document represents a comparison between DTC® (Direct-to-Card®) and Reverse Transfer, "Retransfer", or HDP® (High Definition Printing®) card printing methods.

Attribute / Consideration	DTC (Direct-to- Card)	Reverse Transfer (Retransfer) or HDP (High Definition Printing)
Text and Image Application Method	• Text and images are printed directly to the surface of the card through heat and pressure. • The printhead comes into direct contact with the card.	• Text and images are first printed onto a clear film. Through heat and pressure, the film is then fused to the surface of the card. • The printhead never comes into direct contact with the card surface. HID Global's retransfer printing method is referred to HDP (High Definition Printing).
Card Print Area	• Edge-to-Edge • Slight margin between card's edge and print ribbon.	• Over-the-Edge • Prints over entire card surface – known as "full bleed". • No blank border at the outer edges – provides complete card coverage.
Print Quality	• Good quality • Images are somewhat less vibrant and sharp that those printed using Retransfer/HDP printing. • Text and barcodes are slightly less bold and crisp that those printed using Retransfer/HDP printing. • 300 dpi is the standard resolution.	• Very high quality • Images are typically more vibrant and sharp that with DTC printing. • Text and barcodes are bolder and crisper than with DTC printing. • Higher resolution printing is more generally available (600 dpi).
Printhead Wear	• Because the printhead comes in direct contact with the card surface during printing, printhead wear is more likely and may require printhead replacement over the life of the printer. • Having direct contact with the card surface, DTC printheads have the opportunity to accumulate dust or debris which may affect printed card quality and/or cause damage to the printhead.	• Because the printhead never comes in contact with the card surface during printing, there is little opportunity for the printhead to become damaged or worn. Retransfer/HDP printheads tend to outlast those used for DTC printing. • Retransfer printheads are much less likely to incur dust accumulation and/or damage as they are never in direct contact with the card surface during printing.

Attribute / Consideration	DTC (Direct-to- Card)	Reverse Transfer (Retransfer) or HDP (High Definition Printing)
Card Compatibility - Recommended Card Construction	• Although all card types (PVC, PVC/PET or Polycarbonate cards are compatible with DTC printers), PVC or PVC/PET multi-layer construction cards are recommended for cost considerations. • PVC cards have a typical lifespan of 1 year and are ideal for shorter-term applications such as gift/loyalty cards, temporary ID/visitor ID, or contractor ID badges. • PVC/PET multi-layer composite construction cards have a typical lifespan of 3-4 years and are ideal for slightly longer-term applications such as debit/credit financial cards. • PVC/PET or composite cards improve the card's resistance to UV light, chemicals and general wear-and-tear over PVC cards.	• Due to the heat applied during the retransfer printing process, use of PVC-only cards is not recommended as the retransfer process may cause cards to warp. A more resilient card such as PVC/PET or Polycarbonate card is recommended for best results. • PVC/PET multi-layer composite construction cards have a typical lifespan of 3-4 years and are ideal for slightly longer-term applications such as debit/credit financial cards. • PVC/PET or composite cards improve the card's resistance to UV light, chemicals and general wear-and-tear over PVC cards. • Polycarbonate better resists heat and even high humidity with an expected lifetime of 5 to 10 years making it an ideal card type for applications such as Driver's Licenses, Corporate Employee/Physical Access badges. • Polycarbonate cards also support laser engraving which creates a permanent, unalterable card.
Durability	Good • Durability may be enhanced by applying an overlaminate to card.	Inherently more durable than DTC printed cards because the Retransfer or HDP film that is applied during the printing process acts as a natural and durable barrier between text/images and the outside world.
Security	Good	• Highly Secure • Cards produced by high definition printing solutions are more secure and durable than other types of cards. They are inherently tamper-evident — if a counterfeiter tries to peel apart the layers, the image essentially destroys itself.
Embedded Electronics Recommendations	• Not recommended for DTC printing. • Ridges formed by embedded electronics within the card can affect image quality. • Because the printhead comes in direct contact with the card surface, embedded electronics have the potential to damage the DTC printhead.	• Reverse Transfer or HDP printing is highly recommended for cards that contain embedded chips or antennae for best image quality results. • Because HDP film is fused to the surfaces of proximity or smart cards, it naturally conforms to ridges and indentations formed by the embedded electronics inside the card. As a result, images and text printed on the card are crisper and more vibrant. • Because the printhead never comes in contact with the uneven card surfaces formed by underlying embedded electronics, there is virtually no potential for printhead damage.

Attribute / Consideration	DTC (Direct-to- Card)	Reverse Transfer (Retransfer) or HDP (High Definition Printing)
Price	• DTC printers are generally less expensive than Retransfer/HDP printers. • Consumables costs also tend to be lower as no additional film is required when printing directly to the card.	• Retransfer/HDP printers are generally more expensive than DTC printers. • Additional consumables (retransfer or HDP film) is required which can increase overall cost-per-card.
Warranty	Because Direct-to-Card printers print directly to card surfaces, there is a higher potential for damage thus, warranties may be more limiting than those for Retransfer/HDP printers.	Because Retransfer/HDP printers do not print directly to card surfaces, there is less potential for damage thus, warranties may less limiting than those for DTC printers.

Conclusion

DTC printing offers exceptional value when paired with the right organization, card program, and physical card type. DTC printers are excellent choices for programs where:

- Initial printer hardware investment is limited
- Cost-per-card is of utmost concern
- Desired card longevity does not exceed 4-5 years
- Limited or no electronics will be embedded within the cards

Retransfer or HDP printing allows organizations to take advantage of many features not available with DTC printing and are generally best suited for card programs where:

- Image quality and/or brand is of paramount concern
- Higher definition printing is required for very small or complex characters
- Over-the-edge printing is desired
- Card durability and longevity is of utmost concern
- Tamper-evident cards are desired
- Laser engraving / tactile security features will be applied
- Cards will contain embedded electronics (chips and/or antennae)